EFFECT OF KNOWLEDGE MANAGEMENT, MANAGEMENT INNOVATION AND DYNAMIC CAPABILITIES IN SUSTAINING COMPETITIVE ADVANTAGE IN TURBULENT BUSINESS ENVIRONMENTS

LIM ING KEAT

DOCTOR OF PHILOSOPHY

UNIVERSITI UTARA MALAYSIA

EFFECT OF KNOWLEDGE MANAGEMENT, MANAGEMENT INNOVATION AND DYNAMIC CAPABILITIES IN SUSTAINING COMPETITIVE ADVANTAGE IN TURBULENT BUSINESS ENVIRONMENTS

By

LIM ING KEAT

Thesis Submitted to the

Othman Yeop Abdullah Graduate School of Business,

Universiti Utara Malaysia, In Fulfillment of the Requirement for

the Degree of Doctor of Philosophy

Pusat Pengajian Pengurusan Perniagaan
(School of Business Management)

Kolej Perniagaan
(College of Business)

Universiti Utara Malaysia

PERAKUAN KERJA TESIS / DISERTASI
(Certification of thesis / dissertation)

Kami, yang bertandatangan, memperakukan bahawa
(We, the undersigned, certify that)

LIM ING KEAT (96156)

calon untuk Ijazah
(candidate for the degree of) **DOCTOR OF PHILOSOPHY**

telah mengemukakan tesis / disertasi yang bertajuk:
(has presented his/her thesis / dissertation of the following title):

EFFECT OF KNOWLEDGE MANAGEMENT, MANAGEMENT INNOVATION AND DYNAMIC CAPABILITIES IN SUSTAINING COMPETITIVE ADVANTAGE IN TURBULENT BUSINESS ENVIRONMENTS

seperti yang tercatat di muka surat tajuk dan kulit tesis / disertasi.
(as it appears on the title page and front cover of the thesis / dissertation).

Bahawa tesis/disertasi tersebut boleh diterima dari segi bentuk serta kandungan dan meliputi bidang ilmu dengan memuaskan, sebagaimana yang ditunjukkan oleh calon dalam ujian lisan yang diadakan pada:
20 Julai 2019.
(That the said thesis/dissertation is acceptable in form and content and displays a satisfactory knowledge of the field of study as demonstrated by the candidate through an oral examination held on:
20 July 2019.

Pengerusi Viva *(Chairman for Viva)*	: **Assoc. Prof. Dr. Hoe Chee Hee**	Tandatangan *(Signature)*	
Pemeriksa Luar *(External Examiner)*	: **Prof. Dr. Zainal Abidin Mohamed (USIM)**	Tandatangan *(Signature)*	
Pemeriksa Dalam *(Internal Examiner)*	: **Dr. Chong Yen Wan**	Tandatangan *(Signature)*	

Tarikh: **20 July 2019**
(Date)

Nama Nama Pelajar (Name of Student)	:	**Lim Ing Keat**
Tajuk Tesis / Disertasi *(Title of the Thesis / Dissertation)*	:	**Effect of Knowledge Management, Management Innovation and Dynamic Capabilities in Sustaining Competitive Advantage in Turbulent Business Environments**
Program Pengajian *(Programme of Study)*	:	**Doctor of Philosophy (Management)**
Nama Penyelia/Penyelia-penyelia *(Name of Supervisor/Supervisors)*	:	**Assoc. Prof. Dr. Kadzrina Abdul Kadir**
	:	**Assoc. Prof. Dr. Thi Lip Sam**

Tandatangan

Tandatangan

PERMISSION TO USE

In presenting this thesis in fulfilment of the requirements for a Post Graduate degree from the Universiti Utara Malaysia (UUM), I agree that the Library of this university may make it freely available for inspection. I further agree that permission for copying this thesis in any manner, in whole or in part, for scholarly purposes may be granted by my supervisor(s) or in their absence, by the Dean of Othman Yeop Abdullah Graduate School of Business where I did my thesis. It is understood that any copying or publication or use of this thesis or parts of it for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to UUM in any scholarly use which may be made of any material in my thesis.

Requests for permission to copy or to make other use of materials in this thesis in whole or in part should be addressed to:

Dean of Othman Yeop Abdullah Graduate School of Business

Universiti Utara Malaysia

06010 UUM Sintok

Kedah Darul Aman

ABSTRACT

The main purpose of this study was to examine the association of multiple firm-level capabilities (i.e. knowledge management, dynamic capabilities, and management innovation) with a proposed sustainable competitive advantage measurement in the Malaysian Electrical and Electronic industry. While sustainable competitive advantage was examined in relationship to multiple firm-level capabilities, this study also assessed the moderating effects of perceived environmental dynamism between the predictor variables and the criterion. The motivation for this study was driven by the need to examine sustainable competitive advantage in a holistic manner. This study used the resource-based theory (RBT) as the main theory to examine the relationships between the variables in the proposed conceptual framework. The simple random sampling procedure was used to select the targeted respondents comprised of E&E manufacturing firms in Malaysia. Of the 185 usable responses, the partial least squares structural equation modelling (PLS-SEM) was used to test the research hypothesis. Positive relationships were found in two direct relationships: sustainable competitive advantage and knowledge management, sustainable competitive advantage and dynamic capabilities, while perceived environmental dynamism did not moderate the relationships between the predictor variables and the criterion variable. While developing a new measure to conceptualise sustainable competitive advantage, its relationships with knowledge management, dynamic capabilities, and management innovation are hoped to contribute nascent theoretical insights. Practically, the findings provide the E&E manufacturing industry some guidance on how to sustain competitive advantage over the competitors. Likewise, the understandings may also assist the policy-makers to develop or to adjust policies to better-fabricate assistance channelled to the E&E manufacturing industry. Methodological limitations and potential avenues for future research are also identified.

Keywords: Sustainable Competitive Advantage (SCA), Knowledge Management (KM), Management Innovation (MI), Dynamic Capabilities (DCs), Electrical and Electronics (E&E) Manufacturing Industry.

ABSTRAK

Tujuan utama kajian ini adalah untuk menyelidik keupayaan persatuan di pelbagai peringkat firma (iaitu, pengurusan pengetahuan, keupayaan dinamik, inovasi pengurusan) dengan pengukuran keunggulan kompetitif yang berterusan yang dicadangkan dalam industri Elektrik dan Elektronik Malaysia. Walaupun kelebihan daya saing yang mampan diteliti dalam hubungan dengan keupayaan pelbagai peringkat firma, kajian ini juga menilai kesan penyederhanaan dari dinamisme persekitaran yang diandaikan antara pemboleh ubah dan kriteria peramal. Motivasi untuk kajian ini didorong oleh keperluan untuk menilai kelebihan daya saing yang mampan secara holistik. Kajian ini menggunakan teori berasaskan sumber (RBT) sebagai teori utama untuk mengkaji hubungan antara pemboleh ubah dalam kerangka konsep yang dicadangkan. Prosedur persampelan rawak mudah digunakan untuk memilih responden yang disasarkan yang terdiri daripada firma pembuatan E & E di Malaysia. Daripada 185 maklum balas yang boleh digunakan, pemodelan persamaan struktur kuasa dua terkecil (PLS-SEM) digunakan untuk menguji hipotesis kajian. Hubungan positif ditemui dalam dua hubungan langsung: kelebihan daya saing yang mampan dan pengurusan pengetahuan, kelebihan daya saing yang mampan dan keupayaan dinamik, sementara dinamisme alam sekitar yang dianggap tidak menyederhanakan hubungan antara pemboleh ubah ramalan dan pembolehubah kriteria. Semasa membangunkan langkah baharu untuk mengkonsepkan kelebihan daya saing yang mampan, hubungannya dengan pengurusan pengetahuan, keupayaan dinamik, dan inovasi pengurusan berharap dapat menyumbang pemahaman teoritis yang baharu. Secara praktik, penemuan ini memberi industri pembuatan E & E beberapa panduan tentang cara untuk mengekalkan kelebihan daya saing berbanding pesaing. Di samping itu, pemahaman juga boleh membantu para pembuat dasar untuk membangun atau menyesuaikan dasar bagi menghasilkan bantuan yang lebih baik kepada industri perkilangan E & E. Akhie sekali, batasan metodologi dan potensi arah untuk penyelidikan masa hadapan juga dikenal pasti.

Kata kunci: Kelebihan Daya Saing Mampan (SCA), Pengurusan Pengetahuan (KM), Inovasi Pengurusan (MI), Keupayaan Dinamik (DCs), Industri Pembuatan Elektrik dan Elektronik (E & E)

ACKNOWLEDGEMENT

I want to dedicate this page, as a token of appreciation to the people who had played a pivotal role in the completion of this thesis. Without them, it would have been an uphill battle undertaking this research. First of all, my heartfelt gratitude to my beloved family: My parents, my brother, and sister. I am deeply indebted to you all for your patience, understanding, and continuous support, emotionally and financially, all these years.

I owe a debt of gratitude to my supervisors, Assoc. Prof. Dr. Cheng Wei Hin, Assoc. Prof. Dr. Thi Lip Sam and Assoc. Prof. Dr. Kadzrina Abdul Kadir who have been a constant source of invaluable support and guidance. Especially, Dr. Thi, my highest thank goes to you, above all in UUM; you pulled me up and gave my PhD study a new breath. I truly had benefited from your patience in supervising me.

This acknowledgement piece is incomplete without the mentioning of the support and encouragement I received particularly from Prof. Dr. Pang Siew Nooi, Dr. Jennie Soo Hooi Sin, Dr. Irene Yong Seok Ching, Dr. Giovann Ng Chun Won, Dr. Francis Chuah Chin Wei and Mr. Teh Kee Sin. Your kindness and discretion, I will never forget.

Lastly, I'd like to express my heartfelt gratitude to the Ministry of Education Malaysia for providing me with a scholarship to undertake my doctoral programme. Without the financial support from the Ministry of Education Malaysia, it would not have been possible for me to enrol in the doctoral programme.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATION

AVE	Average Variance Extracted
DCs	Dynamic Capabilities
DCV	Dynamic Capabilities View
E&E	Electrical and Electronics
EOI	Export-oriented Industrialisation Strategies
FMM	Federation of Malaysian Manufacturers
GDP	Gross Domestic Product
HCMs	Hierarchical Component Models
HICOM	Heavy Industries Corporation of Malaysia
ISI	Import-Substitution Industrialisation Strategies
IT	Information Technology
KM	Knowledge Management
LVS	Latent Variable Scores
MATRADE	Malaysia External Trade Development Corporation
MBV	Market-based View
MI	Management Innovation
MIDA	Malaysian Industrial Development Authority
MNCs	Multinational Corporations
NEP	New Economic Policy
OECD	Organisation for Economic Corporation and Development
PED	Perceived Environmental Dynamism
PLS-SEM	Partial Least Square Structural Equation Modelling
R&D	Research and Development
RBT	Resource-Based Theory of the Firm
SCA	Sustainable Competitive Advantage
SEM	Structural Equation Modelling
SMEs	Small and Medium Enterprises
VIF	Variance Inflation Factor
VRIN	Valuable, Rare, Inimitable, and Non-substitutable

LIST OF APPENDICES

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Malaysia has witnessed relatively rapid economic growth and development amid challenging internal and external environment over the past few decades. As a developing country, Malaysia used exports as its turbine of growth and development since the 1970s. Malaysia's export has expanded significantly over the five decades and the composition of exports had gradually changed from agricultural and mining products in the 1960s to manufactured goods in the 1980s (Bank Negara, 2011). In other words, the strong economic growth in terms of country's exports was being fuelled by the traditional sectors which include natural resources and plantation at the beginning and subsequently followed by the transformation and expansion of its manufacturing sector (EPU, 2014).

Malaysia, previously known as Malaya under the colonisation of the British Empire, tin and rubber contributed 70 per cent of the country's export (Yusof & Deepak, 2008). In addition, the manufacturing industry was not very significant during the colonial era (Jomo, 1993). The percentage of manufacturing in the total gross domestic product (GDP) was only 8 per cent in 1955 and the agricultural, mining, construction and other sectors contributed the remaining 92 per cent (Alavi, 1996).

After Malaya gained independence in 1957, the nation aimed to be a developed economy (Comin, 2014). As in many developing Asian countries, the Malaysian government has embarked on industrialisation soon after the independence in 1957 with the aim of diversifying its agriculture-based economy to other economic sectors and create employment opportunities at the same time (Chee, 1987). The industrialisation of Malaysia economy occurred with two deliberate industrial strategies, namely import-substitution (ISI) and export-oriented (EOI) industrialisation strategies (Rasiah, 1996; Yusoff, Abu Hassan, & Abdul Jalil, 2000).

In the post-independence period, the government had actively sought to promote industrialisation (Jomo & Edwards, 1993). The country's economy then was characterised by unstable demand for primary exports (tin and rubber in particular), rapid labour force growth but high unemployment, high levels of imports; excess domestic demand and fragile balance of payment (Chee, 1987). Given the challenging internal environment, ISI strategy with the introduction of the Pioneer Industry Ordinance 1958 was introduced to create employment opportunity and restrict imports (Jomo & Edwards, 1993). This strategy aimed to expand downstream manufacturing industries, especially consumer goods.

Despite its contribution to the nation's growth, the ISI strategy soon confronted with the boundaries of the domestic market and it had created distortions in domestic product prices (Osman Rani & Mohd. Haflah Piei, 1990). The massive imports of capital and intermediate goods used in the production of simple consumer goods under ISI strategy intensified the balance-of-payments problem (Alavi, 1996). In addition to this, the ISI

strategy was unable to create jobs and the issue of unemployment remained because of the comparatively weak labour-absorption capacity of the ISI activities (Alavi, 1996).

Hence, the fundamental contradictions of the ISI strategy were getting apparent by the mid-1960s and the nation made gradually shift from the mainly import-substitution to a more outward-oriented strategy as a way to move towards export-market oriented strategy (Jomo & Edwards, 1993; Khalafalla & Webb, 2001). The new emphasis on export-market oriented strategy was formalised by the Investment Incentives Act 1968 and the establishment of the Malaysian Industrial Development Authority (MIDA) (Yusuf & Nabeshima, 2009).

With the introduction of the Investment Incentives Act 1968, a new focus namely "export-substitution" was seen to provide an alternative to ISI strategy. (Osman Rani & Mohd. Haflah Piei, 1990). Investment Incentive Act of 1968 was specifically formulated to promote export-oriented foreign firms to set up their production facilities in Malaysia (Clarke, Driffiel, & Halim, 2003). The Investment Incentive Act 1968 provided investment credits, tax exemptions, privileged treatment for import permits and infrastructural facilities to these export-oriented foreign firms. Despite the Investment Incentive Act 1968 have benefited the economy, the Investment Incentive Act 1968 had no strategy in place to promote technological upgrading and production of creative and innovative products and services (Rasiah, Mubarik, & Yap, 2017).

In 1971, the New Economic Policy (NEP) was launched to alleviate the poverty and restructure of employment and the ownership of assets, EOI strategy was the vehicle for achieving these twin objectives. In addition, the Investment Incentives Act of 1968 was

reinforced by the introduction of the NEP, which highlighted the role of manufacturing (Rashid & Elameer, 1999). Besides, the government continued efforts to attract foreign manufacturing firms in the 1970s with the formulation of the Free Trade Zone Act 1972. The Free Trade Zones Act 1972 allowed special low-tariff zones to be set up (Gomez & Sundaram, 1999) and signalled the start of an effort to change the composition of exports (Yusof & Deepak, 2008).

The Free Trade Zones Act of 1972 promoted the setting up of industrial estates exempted from customs regulations, developed by state development corporations and catering to firms manufacturing for export (Jomo & Edwards, 1993). The EOI strategy, especially after the launching of free trade zones proved remarkably successful in stimulating growth (Rasiah, 1995). With the availability of quality labour force and physical infrastructure, multinational corporations (MNCs) from Japan, United States of America and, Europe were offered attractive terms to set their low-tech assembly operations in Malaysia in the 1970s (Yusuf & Nabeshima, 2009).

Although the foundation of an export-incentive policy had already been established in the Investment Incentive Act 1968, export expansion came to reality from 1970 onwards (Khalafalla & Webb, 2001). In fact, the external demand has been a crucial driver for manufacturing sector growth since the 1970s (Osman Rani & Mohd. Haflah Piei, 1990). Most of the growth in Malaysian manufactured exports took place between 1970 and 1975. The manufactured exports increased more than 24 per cent a year and the share in total exports increased from 7 per cent in 1970 to 17 per cent in 1975 (Chee, 1987).

By the end of the 1970s, Malaysia was a substantial exporter of raw materials, textiles, other light manufacture products, and electronic and electrical products assembled in factories established by MNCs in the free trade zone areas (Yusuf & Nabeshima, 2009). Malaysia had transformed into a multi-sector economy and the country economy had experienced rapid economic growth during the 1970s primarily driven by the development and growth of the manufacturing industry (Rohana & Tajul Ariffin, 2010). Due to the fact that the industrial policy at this stage for had been centred on export growth, the issue of developing entrepreneurial skills, creativity, innovation, and other knowledge-based products and services has not been the focus in developing country's economy.

By the early of the 1980s, a large amount of EOI sector had commenced in Malaysia (Jomo & Edwards, 1993). As a result of eroding competitive advantage in labour-intensive industries, the government continued to diversify the country economy in the 1980s by promoting heavy industrial sectors such as automotive, steel manufacturing, cement, machinery and equipment, and petrochemical industries (Abdillah, 2014). The heavy industrialisation scheme began as an import-substituting industry, sometimes referred to as a second phase ISI (Rasiah, 1996). The heavy industrialisation programme aimed at developing large-scale, capital-intensive, high-technology and high-skill projects or through joint ventures with foreign companies (Ministry of Finance Malaysia, 2015).

Under the Fourth Malaysian Plan (1981-1985), the government took a significant policy shift, whereby heavy industries scheme involving specialised government agency—Heavy Industries Corporation of Malaysia (HICOM) with full government backing as a

means to develop the heavy industries (Alavi, 1996). The objective of HICOM was to diversify manufacturing activity, create more local linkages, promote small and medium enterprises (SMEs), and lead technological development and innovation by collaborating with foreign firms and investing in local research and development (R&D) to promote technological deepening (Lall, 1995). This was also being inspired by the success of Japan and South Korea in their heavy industrialisation effort (Alavi, 1996). However, the heavy industrialisation scheme was not a success due to the nation's domestic protectionist policy (Ministry of Finance Malaysia, 2015).

At the same time, the world economic recession in 1985 and price downfall of Malaysia's major export commodities had resulted the economic growth declined to 4.5 per cent per annum during the 1980-87 periods. However, the contribution of the manufacturing sector remained unchanged (Osman Rani & Mohd. Haflah Piei, 1990). When Malaysia experienced negative growth for the first time in 1985, the government responded by providing attractive incentives to attract foreign investment with the emphasis on the production of manufactured goods for export (Khalafalla & Webb, 2001).

The manufacturing sector had become the turbine of growth between 1987 and 1996. This sector had overtaken the agriculture sector as the most important contributor to national GDP growth in the mid-1980s. The manufacturing exports share in the total exports had increased from 33 per cent in 1985 to about 80 per cent by the middle of the 1990s (Mahani, 2002). By the end of 1995, Malaysia was the world's largest exporter of air-conditioners, semiconductors, oleo chemicals and latex products, such as gloves, rubber thread and catheters (Ministry of Finance Malaysia, 2015).

However, the period of impressive high growth started in the late 1980s was disrupted by the Asian financial crisis that occurred between 1997-1998 and which had severe implications for the country economy. Prior to the crisis, Malaysia had maintained high growth rates averaging 8.9 per cent during the period 1988–1996 (Ariff & Abubakar, 1999). The 1997-1998 Asian financial crises put 12 years of continuous growth of GDP to an end. In 1998, the GDP contracted by 7.4 per cent (Ministry of Finance Malaysia, 2015). Proactive moves were employed by the Government to drive the economy by implementing various macroeconomic, monetary and financial policies to facilitate the nation to recover from the Asian financial crisis (Lim & Goh, 2012).

Apart from this, the effort to recover the Malaysian economy in Asia Financial Crisis was further boosted by growth in the external front, including the boom in the world electronics cycle. This, concurrently with the steady exchange rate, supported the development of export-oriented manufacturing industries, particularly electrical and electronics (E&E) (Ministry of Finance Malaysia, 2015). Thereby, the electronics industry played an important role in Malaysia's spectacular recovery from the Asian financial crisis.

The economy rebounded strongly after the financial crisis, driven by the restored dynamism of Malaysia's export manufacturing sector (World Bank, 2017). The Malaysian economy began to grow strongly in the second quarter of 1999, and the national economy had revived and recorded a growth of 6.1 per cent in 1999 that marked the end of the nation's recession. The Malaysian economy posted constant growth, averaging 5.9 per cent yearly from 2002 to 2007, except in 2001 (0.5 per cent) due to the dot.com crisis (Ministry of Finance Malaysia, 2015).

Although growth had revived after the 1997-1998 Asian financial crises, pre-crisis levels of economic growth remained out of reach. The average of GDP growth by the beginning of the 2000s had consistently been 2 per cent lower than GDP growth achieved during the 1990s (Yusuf & Nabeshima, 2009). This was primarily due to the depressed private investment in the aftermath of the Asian financial crisis.

Malaysia was hit again by the global financial crisis that took place in late 2008 and continued until early 2009, albeit it was less severe than the Asian Financial Crisis in 1998. Particularly, the global financial crisis that hit the country was a trade and GDP growth crisis rather than a financial crisis. This is because Malaysia had consolidated its banking and financial sector following the Asian financial crisis to be more flexible and able to avoid another financial meltdown (Lim & Goh, 2012).

Despite the fact that Malaysia was able to prevent another financial meltdown, the country's export volume and overall Malaysia GDP growth rate for 2009 had fallen significantly. Taking into account that Malaysia's high export portion in GDP ratio, the tightening in external demand was the major factor burdening the country economy (Mahani & Rasiah, 2009). The primary direct source of the problems is the contraction of manufacturing demand, more particularly in E&E industry, as the targeted export destinations were developed economies like the United States of America and Western Europe which have experienced lower demand (Mahani & Rasiah, 2009; Nambiar, 2010).

The approach adopted by the Government to mitigate the Global financial crisis was similar to the period between 1997-1998 Asian financial crisis, with the public sector

playing a dominant role in reviving the economy (Mahani & Rasiah, 2009). In addition, Malaysia's rebound was aided by a marked increase in the export sector driven by regional and global demand (Schellekens, 2010). The structural reform implemented by the government after the Asian Financial Crisis hastened its economic recovery from the 2008 Global Financial Crisis, with real GDP growth averaging 5.3 per cent per year between 2011 and 2015 (Koen, Asada, Nixon, Habeeb Rahuman, & Mohd Arif, 2017).

On May 21, 2015, the government unveiled the 11th Malaysia Plan (2016-2020) aimed to transform Malaysia into a high-income and developed nation characterised by innovation and creativity. The on-going plan's goals include increasing Malaysia's export potential and trade balance, and, promoting investment among others. The manufacturing sector was targeted to focus on producing innovative, high-value, diverse, and complex products. In light of this, three manufacturing subsectors, namely chemicals, E&E and, machinery & equipment are targeted to be the catalyst for this transition. Apart from this, industries such as medical devices and aerospace components will also play a vital role in this transition due to their high growth potential. The manufacturing sector is anticipated to grow at 5.1 per cent per annum, contributing 22.1 per cent to GDP and 18.2 per cent of total employment by 2020 (EPU, 2015).

Since mid-2016, the world economy has undergone a cyclical recovery (World Bank, 2017). The manufacturing sector in Malaysia grew by 4.4 per cent in 2016, mainly supported by continued expansion in both export and domestic-oriented industries (Bank Negara Malaysia, 2017). The strong rebound in economic activity in 2017 had propelled the global economy to record its highest growth rate since 2011. The country economy also registered a robust growth of 5.9 per cent while the manufacturing sector expanded

by 6 per cent in 2017 (Bank Negara Malaysia, 2018). Following the solid performance of manufacturing sector in 2017, the growth in exports continued in first half of 2018 which was underpinned by the robust performance in manufactured exports, particularly E&E products (World Bank, 2018). Overall, E&E products made up the most significant component of Malaysia's exports in 2018, accounting 38.2 per cent or RM380.81 billion (MITI, 2019).

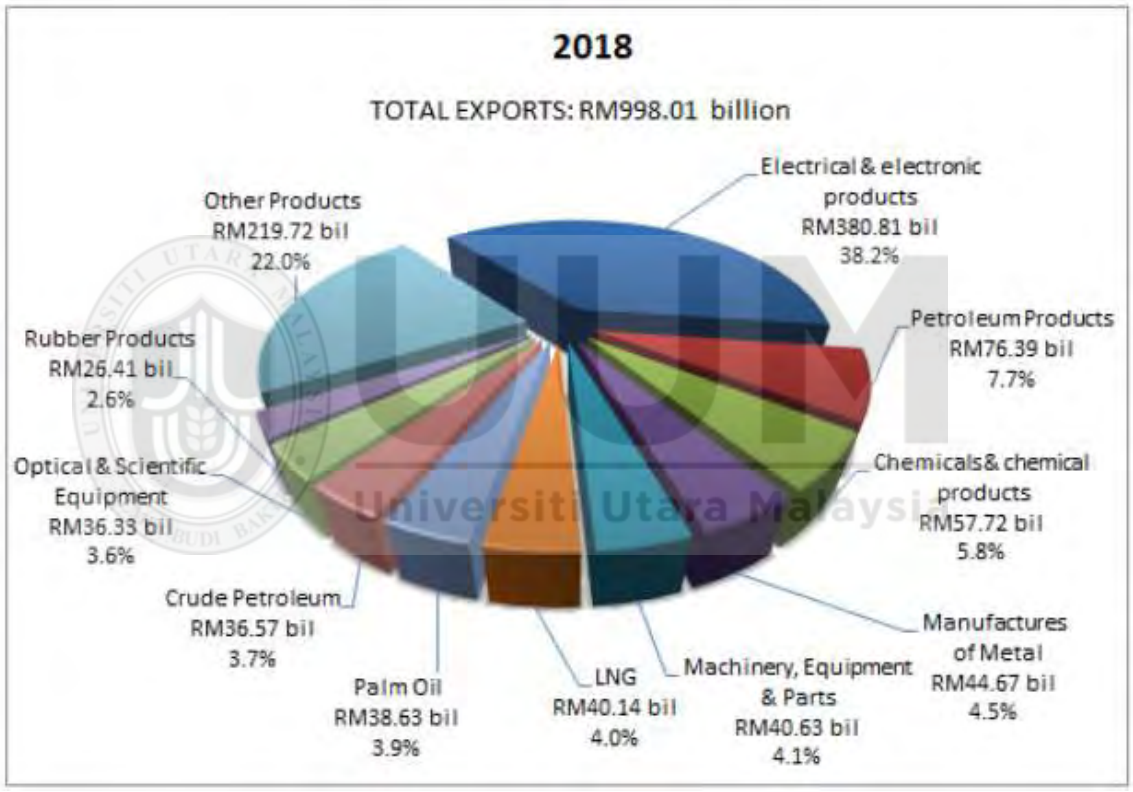


Figure 1.1
Malaysia Top 10 Major Export Products, 2018
Source: MATRADE, 2019

While Malaysia is moving steadily towards a more diversified economy, the manufacturing sector remains an important sector in the country economy. Since the late 1970s, the strong economic growth in terms of country's exports is fuelled by the expansion of its manufacturing sector (Rahman, Aflah, Chowdhury, & Khan, 2014).

Nonetheless, Malaysia's growth is also vulnerable to a currency crisis or a general slowdown in the global economy. This is because of its high level of integration with global markets and its dependence on global value chains as a source of growth (World Bank, 2018). Hence, the elevated financial market volatility either provoked by changing monetary policy expectations in advanced economies or crisis in other regions could span across Malaysia, through capital outflows and pressures on exchange rates (World Bank, 2018).

It is important to note that export contributes significantly to the growth of Malaysian GDP by earning foreign exchange and achieving economies of scale (Liang & Zuradi, 2012). However, unlike other Asian counterparts like Thailand, Vietnam, and, Korea, the share of Malaysia's exports in the world market had declined from 1.35 per cent to 1.22 per cent between 2005 and 2013 (World Bank, 2014). Therefore, at least through the global financial crisis, there was evidence of reduced competitiveness in Malaysia's exports. Specifically, Malaysian E&E manufacturing industry's market share has also been undermined as a result of stiff competition from emerging economies such as China, India, and, Vietnam (EPU, 2014). The declining exports competitiveness could adversely affect the Malaysian economy (Chandran, Rasiah, & Peter, 2012). This is because E&E manufacturing industry is not location specific and it can be quickly shifted and established in any region where the cost of production is low (Tang, Yip, & Ozturk, 2014).

Although Malaysia had an early start in electronics, it could not build on its technological advantage and move up the value chain in any significant or sustainable manner. In fact, E&E's share of Malaysian export had declined over the last 15 years

(World Bank, 2014) and the industry's ability to maintain its large share of GDP and to drive the country export growth is in doubt (EPU, 2014). Though the E&E's share of exports had increased dramatically during the 1970s and 1980s, its contribution to GDP growth had deteriorated since the year 2000 (PEMANDU, 2010). Over time, statistically, the share of E&E exports declined to 33.4 per cent in 2014 compared to 59 per cent in 2000. More worrying is that E&E exports decline had impeded the growth of the country economy (EPU, 2014).

The E&E exports began to slow down after 2000 due to the fact that there is a growing number of international competitors have increased the pressure of Malaysian exporter. Malaysia's E&E industry faces stiff rivalry from China and Vietnam in labour-intensive and low-cost manufacturing activities (Rasiah, 2017). For example, Vietnam is moving up the E&E value-chain and creating increased competition for Malaysia in lower value-added segments of the industry (Devadason, 2019). Yet, Malaysia is lagging behind Singapore and Taiwan in high-end manufacturing, with the country like China progresses rapidly (MPC, 2015; PEMANDU, 2010).

Furthermore, Malaysia has yet to complete its transition into a high-tech manufacturing destination (MPC, 2015). Besides, E&E industry reveals the threat of the middle-income trap because Malaysia is not competitive in low-cost manufacturing activities and the nation is still incapable of being a primary location for the development and manufacture of high-end products (EPU, 2014; PEMANDU, 2010). In order to overcome these problems, we need to shift to a higher order of manufacturing activities such as the development of new product and product design to sustain the competitive advantage (EPU, 2014).

Despite the challenges highlighted above, the prospect of Malaysia E&E is bright and E&E exports continue to be the main pillar of the country's exports as well as the manufacturing sector. While the development of the E&E industry in Malaysia has been remarkable, the focus now has shifted from repetitive mass production operation to high value-added activities and to be recognised as a regional hub with global recognition for design and development, high value engineering solutions and products, test and engineering services and automation (Wong, 2018).

In light of the dynamic and turbulent global environment, Malaysia needs to continuously focus on knowledge-based and innovative E&E manufacturing sector to increase its export in order to sustain the national economic growth moving forward.

1.2 The Statement of Research Problem

The previous section has put forth the background of study that highlighting the contribution of the manufacturing sector in promoting economic growth in Malaysia. With the erosion in Malaysia's comparative advantage in labour costs and heavy dependence on labour-intensive manufacturing industries, the competitiveness of the Malaysian manufacturing sector in the international market has been squeezed by low wage competitors and advancement in developed countries' innovations (Devadason, 2011, 2019). Having aided Malaysia recovered from the effects of the recent financial crises, Malaysian E&E manufacturing industry needs to sustain its competitive advantage in order to drive the country economic growth.

To address this serious issue, Malaysia has to sustain the competitiveness of the E&E manufacturing industry by establishing a position of sustainable competitive advantage (SCA) over other competitors in the context of optimising the use of resources available to firms. E&E manufacturers in Malaysia can establish an SCA position by exploiting opportunities and neutralising existing and future competitive threats (Newbert, 2008; Sigalas & Economou, 2013). Resource-based theory (RBT) posits that valuable, rare, inimitable, and non-substitutable (VRIN) resources are the sources of the firm's SCA (Barney, 1991). Nonetheless, there is a gap between existing theoretical and empirical studies since the existing literature emphasises the significance of resources and capabilities, only a few studies have examined SCA per se (Cao, Berkeley, & Finlay, 2014; Martynov & Shafti, 2016).

Researchers who have examined SCA have used subjective and ambiguous operationalisation of SCA (Sigalas & Economou, 2013; Sigalas & Papadakis, 2018;

Vinayan, Jayashree, & Marthandan, 2012). No matter what prior studies have proposed, researchers tend to use the term of SCA with different meanings in different contexts (Sigalas, 2015). Generally, SCA is seen mainly in terms of superior firm performance (Newbert, 2007; Sigalas & Papadakis, 2018). However, superior firm performance is perhaps an outcome of a purely random process and not necessarily result from the accumulation and utilisation of resources or capabilities that contribute to firm's SCA (Denrell, Fang, & Zhao, 2013; Henderson, Raynor, & Ahmed, 2012). Notably, SCA is also operationalised as financial performance in past studies (Cao et al., 2014; Newbert, 2007, 2014). Financial performance may not reflect the firm's SCA and firms which pose SCA might be understated (García-Castro & Ariño, 2011; Lev, 2017; Ray, Barney, & Muhanna, 2004). More importantly, the financial performance of a particular firm is not able to deliver the right information/insight on SCA due to the complexity of the business and how they were driven (Battagello, Cricelli, & Grimaldi, 2016). Instead of focusing on a single aspect of firm performance, it is imperative to include triple bottom line (e.g., economic, social and environmental) to examine SCA in order to provide comprehensive insights on firms that sustain their competitive advantage over their competitors (Chen, 2015). Therefore, economic performance, social performance and, environmental performance had been adopted as a comprehensive measure to operationalise the concept of SCA in the current study.

It is not a new idea that knowledge plays an essential role in the economy and Malaysia is incorporating knowledge-based economic model in order to create unique opportunities of business and gaining competitive advantages in the world market. As Malaysia try to avoid the threat of the middle-income trap, it will also need to pay close

attention to growing its knowledge-based industries re-energise the manufacturing sector in the country (Devadason, 2019). Nonetheless, lack of knowledge, more particularly, technological knowledge is another reason for the deterioration of the growth in many countries including Malaysia (Comin, 2014). Knowledge has substituted physical and natural resources as key ingredient for economic development (Newell, 2014). Comin (2014) pointed out that firms such as manufacturing firms need to acquire a specific body of knowledge to move to knowledge-based manufacturing activities. Hence, knowledge management (KM) is imperative for firms that plan to achieve sustainable growth in the long run.

KM represents the processes and practices carried out in a firm in order to leverage their intellectual potential by enhancing the effectiveness and efficiency of the management of organisational knowledge resources (Andreeva & Kianto, 2012; Gold, Malhotra, & Segars, 2001; Heisig, 2009; Inkinen, 2016; Lee & Choi, 2003). Yet, KM is not prevalent in many developing countries even though it has been claimed to be an essential component to enhance SCA (Alaarj, Abidin-Mohamed, & Bustamam, 2016; Jayasingam, Ansari, Ramayah, & Jantan, 2012). KM is also relatively new in the Malaysian setting and Malaysian business firms are lagging behind developed countries in adopting knowledge management practices (Jayasingam et al., 2012; Mohamad, Ramayah, & Lo, 2017). Malaysian business firms are also uncertain of the benefits of KM (Mohamad et al., 2017). Erwee, Skadiang, and Roxas (2012) and Lew, Tan, and Abdul Razak, (2013) highlighted the lack of empirical studies on how Malaysian firms manage knowledge to achieve SCA. Therefore, the current study attempted to examine the effect of KM in sustaining the competitive advantage of Malaysia E&E manufacturing industry.

Innovation is defined as defined as the generation or adoption of new ideas or behaviours (Damanpour & Aravind, 2012). As competition intensifies, innovation is frequently the main source of competitive advantage and economic growth (e.g., Damanpour & Schneider, 2006; Lin, Su, & Higgins, 2016; Tushman & O'Reilly, 2002). Notably, innovation is recognised as the key factor in achieving competitiveness and increasing the economic growth of Malaysia (Chandran, Rasiah, & Peter, 2012; MASTIC, 2014). However, the slowing down of the GDP growth rate since 1997 is a consequence of poor performance and lacking in innovative processes and outputs (Rasiah & Yap, 2015). Moreover, the effort to introduce new innovative products and processes in the Malaysian manufacturing sector has been described as low (Hosseini & Narayanan, 2014). Particularly, Yusuf and Nabeshima (2009) pointed out Malaysia was less innovative as compared to Korea and Taiwan. In order to respond to these challenges, Malaysia industrial sectors need to be innovative and creative by following the effort by Korea and Taiwan (OECD, 2016). By doing so, the E&E sector, one of the catalytic sub-sectors under the 11th Malaysia Plan, will energise the manufacturing sector toward producing higher value-added and complex products on the road.

Meanwhile, past studies pointed out innovation can be considered as a complex phenomenon which including technological and non-technological aspects (Armbruster, Bikfalvi, Kinkel, & Lay, 2008; Damanpour, 2014). The importance of innovation as a source of the SCA is generally focused on technology-based process and product innovations but non-technological innovations have not been acknowledged (Azar & Ciabuschi, 2017; Damanpour, 2014; Damanpour & Aravind, 2012; Hervas-Oliver, Sempere-Ripoll, Boronat-Moll, & Rojas-Alvarado, 2017; Volberda, Van Den Bosch, &

Mihalache, 2014; Walker, Chen, & Aravind, 2015). The importance of non-technological innovation to sustain firms' competitiveness has been realised and non-technological innovation is often viewed as the prerequisite for the successful introduction of technological innovations (Armbruster et al., 2008; Azar & Ciabuschi, 2017; Damanpour, 2014). In other words, non-technological innovation facilitates changes including technical innovation thus improving the competitive position. The study of non-technological innovation as a relevant variable only emerged recently. Hence, little is known about its outcomes (Fernandes Rodrigues Alves, Vasconcelos Ribeiro Galina, & Dobelin, 2018; Nieves, 2016; Sapprasert & Clausen, 2012). In addition, OECD (2016) recommended Malaysia to take the non-technological innovation into account as an alternative approach to gain competitive advantage. Given the importance of innovation in driving economic growth in a globalised competitive environment, the current study examined the effect of non-technological innovation (i.e., management innovation) in sustaining competitive advantage of Malaysia E&E manufacturing industry.

As a gateway to trade, Malaysian E&E sector remains to be a significant driver of industrial development and contributes significantly to GDP growth, export earnings, investment and employment. It is important to ensure Malaysian E&E sector is well-placed to compete in an increasingly competitive global market. Yet, Malaysian E&E manufacturing firms are still engaged in low value-added activities and yet to transform into high value-added E&E manufacturing activities (Rasiah, 2011; Rasiah, Yap, & Chandran Govindaraju, 2014). The functional upgrading into chip design, wafer fabrication, and R&D in E&E industry since the year 2005 have not been successful in

driving Malaysia's ability to compete globally at the technological frontier (Rasiah, 2017).

From the dynamic capabilities view (DCV) perspective, the value generated by of Malaysia E&E manufacturing industry is still low in the challenging and dynamic business landscape (Teece, 2007; Teece, Pisano, Shuen, & Winter, 1997). In other words, firms in Malaysia still face difficulties to enhance E&E product values from existing resources and capabilities. Due to this, competitive advantages accrued by the firms may not be sustainable in the long run (Li & Liu, 2014). In order to sustain firms' competitive advantage, Teece et al. (1997) asserted that firms should continually adapt, reconfigure and renew their resources and capabilities in the context of rapid environmental changes. However, research on firm's dynamic capabilities (DCs) was mainly conducted in the developed countries (Kaur & Mehta, 2017; Li & Liu, 2014; Naldi, Wikström, & Von Rimscha, 2014). Moreover, research on firms' dynamic capabilities is less common being conducted in the developing countries (Dixon, Meyer, & Day, 2010; Fainshmidt, Pezeshkan, Lance Frazier, Nair, & Markowski, 2016). Little is known about the relationship between dynamic capabilities and the firm's SCA in developing economies, and more so for developing countries like Malaysia. Hence, empirical studies are needed in order to enhance our knowledge of the firm's dynamic capabilities with the firm's ability to achieve SCA in developing countries.

As a highly open economy, Malaysia will continue to confront substantial risks pertaining to uncertainty in the external environment (World Bank, 2018). Additionally, the E&E industry is highly vulnerable to global economic circumstances and there is also lots of uncertainty in the global trade market. Firms face difficulties to achieve SCA

in today's turbulent business environment (Liu, 2013; Liu & Liang, 2015). Firms that operate in highly dynamic environments have to seize opportunities in the competitive environment and bring in new directions in a timely manner to sustain their competitive advantage (Wilhelm, Schlömer, & Maurer, 2015). However, RBT being static and neglecting the impact of environmental dynamism (Li & Liu, 2014; Wang & Ahmed, 2007; Wilden, Devinney, & Dowling, 2016). Given that the business firms and their external environment are a multifaceted, complex system with parts that associate to each other in many difference ways, forces that affect one part are likely to affect the other part as well (Makadok, Burton, & Barney, 2018). Thus, examining the impact of perceived environmental dynamism (PED) as a moderator will provide a better understanding of how to respond to the dynamic or turbulent environment in order to sustain the competitive edge (Khoo, Yeap, & Ramayah, 2014; Roberson, Holmes, & Perry, 2017).

Having asserted the viewpoint above, the current study operationalised SCA in terms of the economic, social and, environmental performance. Apart from this, the current study also investigated the impacts of KM, management innovation (MI), and, DCs on Malaysia E&E industry's SCA. Towards this end, this study also examined the moderating effect of PED on the relationship between KM, MI and, DCs on SCA.

1.3 Research Question

Based on the arguments put forth in the above, this study pursues to answer the four research questions. These questions are:

1. Do KM processes have any significant influence on the SCA of the Malaysian E&E manufacturing firms?
2. Does MI have any significant influence on the SCA of the Malaysian E&E manufacturing firms?
3. Do DCs have any significant influence on the SCA of the Malaysian E&E manufacturing firms?
4. Does PED moderate the effect of KM processes on SCA of the Malaysian E&E manufacturing firms?
5. Does PED moderate the effect of MI on SCA of the Malaysian E&E manufacturing firms?
6. Does PED moderate the effect of DCs on SCA of the Malaysian E&E manufacturing firms?

1.4 Research Objective

Parallel to the research questions, this study pursues to achieve the following specific objectives:

1. To examine the effect of KM processes on SCA of the Malaysian E&E manufacturing firms.
2. To examine the effect of MI on SCA of the Malaysian E&E manufacturing firms.
3. To examine the effect of DCs on SCA of the Malaysian E&E manufacturing firms.
4. To examine the moderating effect of PED on the effect of KM processes and SCA of the Malaysian E&E manufacturing firms.
5. To examine the moderating effect of PED on the effect of MI and SCA of the Malaysian E&E manufacturing firms.
6. To examine the moderating effect of PED on the effect of DCs and SCA of the Malaysian E&E manufacturing firms.

1.5 Scope of the Study

The current study was conducted in Malaysia and firms selected for were E&E manufacturing firms in Malaysia, identified from the online directory published by Malaysia External Trade Development Corporation (MATRADE) and Federation of Malaysian Manufacturers (FMM) directory. Each survey was responded by the top management of each firm. They were selected as key respondents due to the prominent role that enabled them to comment on organisation-wide phenomena and the implicit processes underlying the internal resources and capabilities of their respective firm. Data collection was carried out from June 2017 until August 2017, covering all states in Malaysia.

1.6 Significance of the Study

This research has both knowledge and practical significance. In the knowledge sense, the significance of this study originates from the fact that only a few studies examined SCA as a multidimensional construct. This study provides an alternative view and contributes by expanding our knowledge on the SCA as a construct which is believed to be under-researched. Also, the present study advances the body of knowledge by introducing comprehensive measures to examine the firm's SCA.

In the practical sense, this study hopes to help E&E manufacturing industry to sustain its competitive advantage in a turbulent business environment. Top management of E&E manufacturing firms should maximise of their resources and capabilities by integrating, reconfiguring, renewing, and recreating its resources and capabilities in response to the changing environment in order to improve firms' capacity to achieve and sustain their competitive advantage. Top management of E&E manufacturing firms is encouraged to

embrace knowledge, innovation and their unique capabilities to achieve competitive advantage in the long run.

1.7 Definitions of Key Terms

To ease the understanding of the study, definitions of key terms used are provided in the following.

1.7.1 Sustainable Competitive Advantage (SCA)

SCA is defined as the competitive advantage that is not easily duplicated by the competitors (Barney, 1991). SCA is measured by economic performance, social performance and environmental performance.

1.7.2 Knowledge Management (KM)

KM is defined as a set of processes, namely knowledge acquisition, knowledge creation, knowledge utilisation, knowledge storage, and knowledge sharing which is anticipated to enhance its performance and competitiveness (Heisig, 2009).

1.7.3 Management Innovation (MI)

MI is defined as the introduction of new management practices, processes, and structures that are intended to further organisational goals (Birkinshaw, Hamel, & Mol, 2008; Vaccaro, Jansen, Van Den Bosch, & Volberda, 2012).

1.7.4 Dynamic Capabilities (DCs)

DCs are defined as the firm's capacity and ability to sense and then seize opportunities and reconfigure their business process to address fluctuating environment (Teece, Pisano, Shuen, & Winter, 1997).

1.7.5 Perceived Environmental Dynamism (PED)

PED is defined as the volatility and uncertainty of external business environment (Dess & Beard, 1984; Duncan, 1972; Jansen, Vera, & Crossan, 2009; Miller & Friesen, 1982; Simerly & Li, 2000).

1.7.6 Electrical and Electronics (E&E) manufacturing firms

E&E manufacturing firms is defined as all E&E manufacturing firms in Malaysia, which manufacturing consumer electronics, electronic components, industrial electronics and electrical products (MIDA, 2014).

1.8 Organisation of the Thesis

This thesis is presented in a sequence of five chapters and the descriptions of all the essential research activities making up this thesis are per detailed separately as follow.

Chapter One presents the background of the study, following with the statement of research problem. This chapter also includes sections on research questions, research objectives, scope of the study, significance of the study, and definition of key terms.

Chapter Two reviews the literature on variables of interest understudied and theories related to this study.

Chapter Three discusses the framework of study, the formulation of hypotheses and the research methodology used to conduct this study. At the beginning of Chapter Three, a conceptual framework of this study was formulated based on the literature review in Chapter Two, which follows by hypotheses formulation to provide answers to the research questions discussed in Chapter One. Subsequently, research methodology is discussed by highlighting the research design, population and sample, operational

definitions, survey instrumentation, questionnaire, data collection and data analysis techniques. In particular, the result of the pilot test is also presented here.

Chapter Four reports the results for the data analysed using the techniques discussed in Chapter Three. This includes results pertinent to the sample profile, outlier detection, multivariate assumptions assessment, measurement models, and the structural model.

Finally, Chapter Five presents the discussion of findings, implications, and conclusion. Further, it also highlights the theoretical and practical contributions and limitations of the study. Finally, the chapter suggests potential future research avenues arising from this study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter furthers the discussion of the previous chapter by reviewing the literature on five main variables and theories related to this study. Firstly, this chapter reviews SCA literature. Secondly, three independent variables, namely KM, MI, and DCs literature are reviewed. Thirdly, PED as the moderating variable is reviewed. Lastly, underpinning theories that used to develop the research framework are discussed.

2.2 Sustainable Competitive Advantage (SCA)

2.2.1 Sustainable Competitive Advantage and Strategic Management

The quest for SCA is the focal point of many strategy management scholars (Chaharbaghi & Lynch, 1999; Coyne, 1986; Fahy, 2000; Guo, 2007; Low & Nair, 2010; Porter, 1985; Rouse & Daellenbach, 1999). The field of strategic management is formed around a focal question: Why do some business firms persistently do well compared to others? For this reason, strategic management scholars seek the reasons why do some firms persistently outperform others? That is to say that one of the central missions of the field of strategic management is to scrutinise and explain the performance heterogeneity among the business firms (Dubey, Goel, & Sahu, 2013; Sigalas & Economou, 2013).

From the theoretical aspect of strategic management, superior performance exists because of specific reasons and these reasons that resemble the concept of competitive advantage (Powell, 2001) and competitive advantage is the fundamental basis for superior performance in the long run (Porter, 1985). In other words, the bottom-line of the superior performance of a business firm is the achievement and maintenance of competitive advantage. Hence, a body of theories has surfaced which discusses the content of competitive advantage and SCA (Dubey et al., 2013).

2.2.1 Theories of Competitive Advantage

The development of theories that help explain competitive advantage has occupied the attention of strategic management scholars for more than half a century and this section aims to provide an overview of the key theories of competitive advantage. The competitive advantage, a concept introduced by Michael E. Porter in 1985 has become one of the key concepts in management science today. A firm is said to have a competitive advantage when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors (Barney, 1991). The concept of competitive advantage is addressed in particular by industrial organisation economists as well as advocates of the RBT (El Shafeey & Trott, 2014; Huang, Dyerson, Wu, & Harindranath, 2015). In other words, a firm realises a competitive advantage either from a well-established market position (Porter, 1980) or from possessing resources that are VRIN (Barney, 1991).

2.2.1.1 Industrial Organisation View

The industrial organisation view asserts that SCA is attained if the firms have a well-established market position in the industry as compared to their competitors (Caves &

Porter, 1977; Porter, 1980; Rumelt, 1991). In other words, a sustained competitive advantage is derived from monopoly rents sustained by protected market position (Caves & Porter, 1977; Porter, 1980). This is contrast to the RBT which focuses on the distinctive nature of the resources and capabilities that undergird competitive advantage. Thus, competitive strategy is primarily conceived as a positioning of the firm in its markets and therefore is often known as the *market positioning view* or the *market-based view* (MBV) (McGee, 2015).

The two of the best-known theories in MBV domain are Bain's (1968) Structure-Conduct-Performance (SCP) framework and Porter's (1980) five forces model (Wang, 2014). Bain (1968) proposed the Industrial Organisation paradigm, also known as the Structure Conduct-Performance (SCP) paradigm. It describes the relationship of how industry structure affects firm behaviour (conduct) and ultimately firm performance. Bain (1968) studied a firm with monopolistic structures and found barriers to entry, product differentiation, number of competitors and the level of demand that effect firm's behaviour.

The SCP paradigm was advanced by researchers (Caves & Porter 1977; Caves 1980; Porter 1980). The SCP paradigm explained why organisations need to develop strategy in response to the structure of the industry in which the organisation competes in order to gain competitive advantages (Wang, 2014). In formulating strategy, firms commonly make an overall assessment of their own competitive advantage via an assessment of the external environment based on the five forces model (Porter 1979; 1985).

Based on the SCP framework, Porter's (1980) five forces model consist of the following: barriers to entry, threat of substitutes, bargaining power of suppliers, bargaining power of buyers and rivalry among competitors (Porter 1985). The five-force model enables organisation to analyse the current situation of their industry in a structured way. However, the model has limitations. Porter's model assumes a classic perfect market as well as static market structure, which is unlikely to be found in present-day dynamic markets (Wang, 2014).

Hence, the relevant literature has shifted from industry-specific factors to firm-specific factors over the last decades (Chatzoglou, Chatzoudes, Sarigiannidis, & Theriou, 2018; Hoopes, Madsen, & Walker, 2003; Lockett & Wild, 2014) and the RBT has become a dominant theory within strategy management literature (Lockett & Wild, 2014; Priem & Butler, 2001).

2.2.1.2 Resource-based Theory (RBT)

Critics of the MBV argue that it is nonsensical to place the MBV at the centre of strategy making leaving the inside of the firm to act as a black box (McGee, 2015). Some, therefore, RBT is being positioned against the industrial organisation view (Barney, 1991). RBT rests on two pivotal premises: first, firms are sophisticated in terms of their resources and capabilities, a state that accounts for the presence of differences in firm resource endowments, and second, resources and capabilities are imperfectly mobile, a state that accounts for these differences to sustain over time (Newbert, 2014). From the RBT perspective, an SCA is either derived from the Ricardian rents that resulted from idiosyncratic firm-specific resources (Lippman &

Rumelt, 1982; Wernerfelt, 1984) or the Schumpeterian rents that arise from the dynamic capability of the business firms to reinforce advantages over time (Teece et al., 1997).

While several scholars (e.g., Penrose, 1959; Wernerfelt, 1984) had committed to the theory's development, it was argued that Barney (1991) who formally articulated the RBT (Newbert, 2014). Yet, the RBT's principal development is pioneered by the conceptual article entitled "A Resource-Based View of the Firm" by Wernerfelt (1984) and subsequently followed by many other scholars between 1984 and the mid-1990s (Kraaijenbrink, Spender, & Groen, 2010). Since then, the RBT has been implemented to a wide range of phenomena, such as DCV (Teece et al., 1997), knowledge-based view (Grant, 1996), natural resource-based view (Hart, 1995), etc.

From the RBT perspective, a firm is perceived to have an SCA over the competitors when the firm is employing unique value-creating strategy/strategies which is/are not simultaneously being employed by any present or potential competitors (Barney, 1991). Barney (1991) pointed out little emphasis has been given by Porter (1985) to the distinctive organisational resources that influence SCA; hence, he continued to develop the concept of resource-based view. Barney (1991) opined that a firm has a sustained competitive advantage "when it is implementing a value creating strategy not simultaneously being implemented by any current or potential competitors and when these other firms are unable to duplicate the benefits of this strategy" (p. 102).

Besides, Barney (1991) had identified four attributes of the firm's resources as a source of an SCA since not all of the substantial resources hold the potential of sustained competitive advantage. According to Barney (1991), the resources must be VRIN.

VRIN is the acronym for these attributes where V for valuable, R for rare, I for imperfectly imitable and, N for non-substitutable. In other words, the SCA is achieved by the business firms that develop and make effective management of the resources and capabilities that tend to be intangible, rare, and hard for others to replicate.

RBT assumes that resource heterogeneity exists among firms within a strategic group. Business firms are said to have an SCA over their competitors when they either acquire or develop a combination of attributes that allow them to outperform their competitors. As posited by Barney (1991), valuable and rare resources could lead to a competitive advantage. Furthermore, imitable and non-substitutable resources allow the business firms to sustain the competitive advantage over their competitors because these resources are limited or no access to their competitors. Thus far, RBT contends the possession of specific key resources and capabilities can achieve and sustain the competitive advantages (Barreto, 2010; Bromiley & Rau, 2015; Denrell et al., 2013; Fahy, 2000; Kraaijenbrink et al., 2010; Mahoney & Pandian, 1992; Ray et al., 2004).

2.2.3 Conceptualisation of the Dependent Variable in the RBT Context

Despite the growing interest in the RBT theory that has been tested in an increasing number of studies, one of the problems with the dominant approach to RBT in the literature is the conceptualisation of the dependent variable in the empirical settings (Bromiley & Rau, 2015; Lockett, Thompson, & Morgenstern, 2009; Newbert, 2014; Ray et al., 2004). In the case of the dependent variable, it is perceived that a variety of performance variables have been used in the literature in defining and measuring competitive advantage (Lockett et al., 2009; Newbert, 2007).

The theoretical and empirical development of the RBT has been analysed in some of the studies (e.g., Armstrong & Shimizu, 2007; Newbert, 2007). Armstrong and Shimizu (2007) pointed out that only 4 out of 145 RBT empirical articles attempted to operationalise SCA. After reviewing of 55 empirical articles, Newbert (2007) found that researchers operationalise the dependent variable in terms of performance was 93 per cent, where 16 per cent was the competitive advantage, and only 2 per cent was sustained competitive advantage or sustained performance.

Based on past literature, RBT researchers tend to conceptualised the dependent variable in terms of an organisational performance as a proxy, either in direct association to the performance of its rivals or relative performance (Cao et al., 2014; Newbert, 2014; Schilke, 2014; Yang, Xun, & He, 2015). To this end, scholars including Barney (2001), perceived firm performance can be used as a substitute for the dependent variable in RBT research (Newbert, 2014). This is because it is common for researchers to define and operationalise SCA in terms of superior performance (McCarthy, Rouse, & Serban, 2015; Sigalas, 2015; Sigalas & Economou, 2013). In other words, superior performance over the rivals serves as an empirical indicator of SCA.

Consistent with this conceptualisation, it is perhaps not surprising that RBT researchers assumed that a firm with an excellent organisational performance enjoys SCA implicitly or explicitly. The reason behind this is that superior performance is associated with the SCA (McCarthy et al., 2015) and attaining SCA will lead to superior performance (Reed & DeFillippi, 1990; Sigalas, 2015). However, this is not the case as sustainable competitive performance is not organisational performance (Ma, 2000; Newbert, 2008;

O'Shannassy, 2008). In other words, realising and sustaining competitive advantage is one of the critical strategic moves in enabling superior performance.

Furthermore, superior performance may result from a purely random process and not necessarily result from the accumulation of resources or capabilities that contribute to the SCA (Denrell et al., 2013; Henderson et al., 2012). For the analytical convenience, RBT researchers assumed different aspects of SCA share the common logical feature with the performance (Powell, 2001). Hence, it is common to see that SCA being conceptualised/ operationalised in terms of superior organisational performance in the theoretical/ empirical studies (Ray et al., 2004). One of the possible reasons is because these two terms are used interchangeably in the literature with the scholar such as Michael E. Porter (Newbert, 2008, 2014).

Apart from being operationalised as superior performance, SCA is also being operationalised as the firm's financial performance in the empirical studies (Cao et al., 2014; Newbert, 2014). Problems could arise in using financial performance to study SCA in empirical settings. Ray et al. (2004) and Garcá-Castro and Ariñ (2011) argued that the financial performance of a firm which has SCA might be understated and might lead to misleading conclusions when that particular firm makes the specific investments in resources or skills that can be sources of SCA using the profit created prior to that. More importantly, raw numbers and ratios indicators derived from the financial records cannot explain the complexity of the business and how they are driven (Battagello et al., 2016).

In fact, a variable must conclusively pick up the core of the theory it is predetermined to measure to be valid (Newbert, 2014). Yet a theory that claims to explain SCA cannot be tested without the attempt to measure it; hence, RBT researchers should focus on the SCA as the dependent variables (Bromiley & Rau, 2015). Given how RBT scholars have defined the performance construct to be a satisfactory proxy for the dependent variable in RBT research, it is suggested any empirical tests of the RBT have to operationalise the SCA in a more nuanced approach that might improve theory and method to provide more significant knowledge about the RBT.

2.2.3 Sustainable Competitive Advantage among Manufacturing Firms

It is hard to measure SCA because there is a lack of comprehensive approaches for evaluating SCA in a business context. Generally, the empirical literature of RBT examines the relationship between resources and capabilities and organisational performance. Moreover, most existing empirical studies using RBT have focused on identifying and operationalising the predictor variable of resources and capabilities while the dependent variable, SCA, has rarely been scrutinised (Cao et al., 2014). This provides a gap for the present study.

Consequently, the measurement criteria for SCA have not been established despite the extensive research focus in RBT (Cao et al., 2014; Vinayan et al., 2012). Traditionally a business firm is claimed to attain an SCA if it has achieved an excellent economic performance over the competitors, oftentimes at the expenditure of society and environment (Glavas & Mish, 2015). Economic indicators are assessed by looking at financial and non-financial variables as the surrogate of the firm's ability to achieve good performance as the measure of SCA (Bansal & DesJardine, 2014). Nonetheless,

having good economic performance is no longer sufficient for a firm to be considered as having an SCA over competitors.

The focus on corporate social and environmental responsibility has become the new phenomena for today's consumers (Ahmad, 2015). Due to institutional pressures, particularly from stakeholders and the issues on the preservation of natural environment has become a challenging task to business firms as a result of global and regional environmental problems, primarily as a result of deteriorating climatic conditions (Eltayeb, Zailani, & Ramayah, 2011; Hanim Mohamad Zailani, Eltayeb, Hsu, & Choon Tan, 2012). Moreover, stakeholders outside the business firm have applied pressure primarily through impacting potential economic gains and resources of the firm (Aguinis & Glavas, 2012). Hence, the business firms are demanded to be more conscious ecologically and socially while flourishing economically.

Hence, the literature of sustainability has argued that firm performance should include a triple bottom line (e.g., economic, social and environmental), instead of only focusing on a single aspect of firm performance such as economic performance (Chen, 2015). According to Hutchins, Robinson and Dornfeld (2013), Brundtland Commission defined sustainability as meeting "the needs of the present without compromising the ability of future generations to meet their needs" (p. 536). Although the pursuance of economic gains is perceived as inconsistent with the concept of sustainability, the triple bottom line can address environmental and social goals while also being profitable (Glavas & Mish, 2015). Lloret (2016) opined that environmental, social and economic sustainability have to be taken into consideration to have a better grip on the meaning of sustainability that could help firms to survive and sustain in the competitive market.

Manufacturing firms are not only aiming to improve the economic performance, but also attempt to be competitive in terms of fulfilling environmental and social responsibilities (Canidas, Gehrsitz, & Semeijn, 2013; Vachon & Klassen, 2008). Gualandris and Kalchschmidt (2016) opined that consumers perceived that manufacturing firms tend to have stronger social and environmental impacts compared to other firms. Hence, numerous stakeholders (e.g., consumers, employees, investors, suppliers, community, government) are holding business firms accountable for social and environmental practices (Glavas & Mish, 2015). Specifically, manufacturing firms are increasingly being held accountable for the impact they exert on the environment in which raw materials for production are being sourced (White, 2009). Consumers and stakeholders are expecting firms to take responsibility to protect the environment and promote ethical behaviour (Ashby, Leat, & Hudson-Smith, 2012). Correspondingly, manufacturing firms are facing pressures from consumers who prefer to buy eco-friendly products (Hanim Mohamad Zailani et al., 2012).

Sustainability has become one of the main concerns for many firms due to increasing environmental and social demands by regulators, investors, consumers and non-governmental firms (Gualandris, Klassen, Vachon, & Kalchschmidt, 2015). In order to measure SCA, there is a need to consider these three pillars of sustainability, namely economic, social and environmental dimensions. Environmental sustainability refers to the consumption of natural resources at a sustainable rate, generating limited emissions and not being taken part in activities that can damage the ecosystem (Kleindorfer, Singhal, & Wassenhove, 2005). The significance of the environmental challenges and firms' critical role in addressing these challenges has led to the increasing relevance of

environmental issues to be considered for firms to sustain their operation (Wagner, 2007). However, Svensson and Wagner (2012) claimed that the prevailing business theories generally disregard the fact that the environment is the eventual stakeholder and source of raw materials. Therefore, it is important to consider the business activities' impact on the environment as an indicator of whether the competitive advantage of the firms can be sustained.

Apart from the environmental aspect, firms cannot operate their business in the long run without interaction with social entities involving employees, consumers, supply chain partners, communities who are part of firm's social ecosystem (Hutchins et al., 2013). According to Rajak and Vinodh (2015), social sustainability is about equity and basic needs and deals with working conditions, human rights, employee's participation, fair wages and cultural diversity. Research has shown that environmental sustainability coupled with economic implications, the social dimension has gained equal importance (Mart ńez-Blanco et al., 2014). It is important to address the issue of whether firms have achieved social performance and competitive advantage can be sustained in the long run.

In sum, SCA can be viewed as the intersection of the economic, environmental and social dimension (see Figure 2.1). However, Rosen and Kishawy (2012) opined the combination of any two pillars (economic and environmental, economic and social, or environmental and social) might not be truly sustainable for firms. Hence, manufacturing firms are likely to achieve SCA over their competitors if these manufacturing firms can meet the demands imposed by economic, environmental, and social ecosystems. Therefore, the ability of business firms to continuously create value for its shareholders, consumers, and society at large can achieve SCA in the long run. As

a result, business firms can outperform their competitors at the same time protect the environment and society.

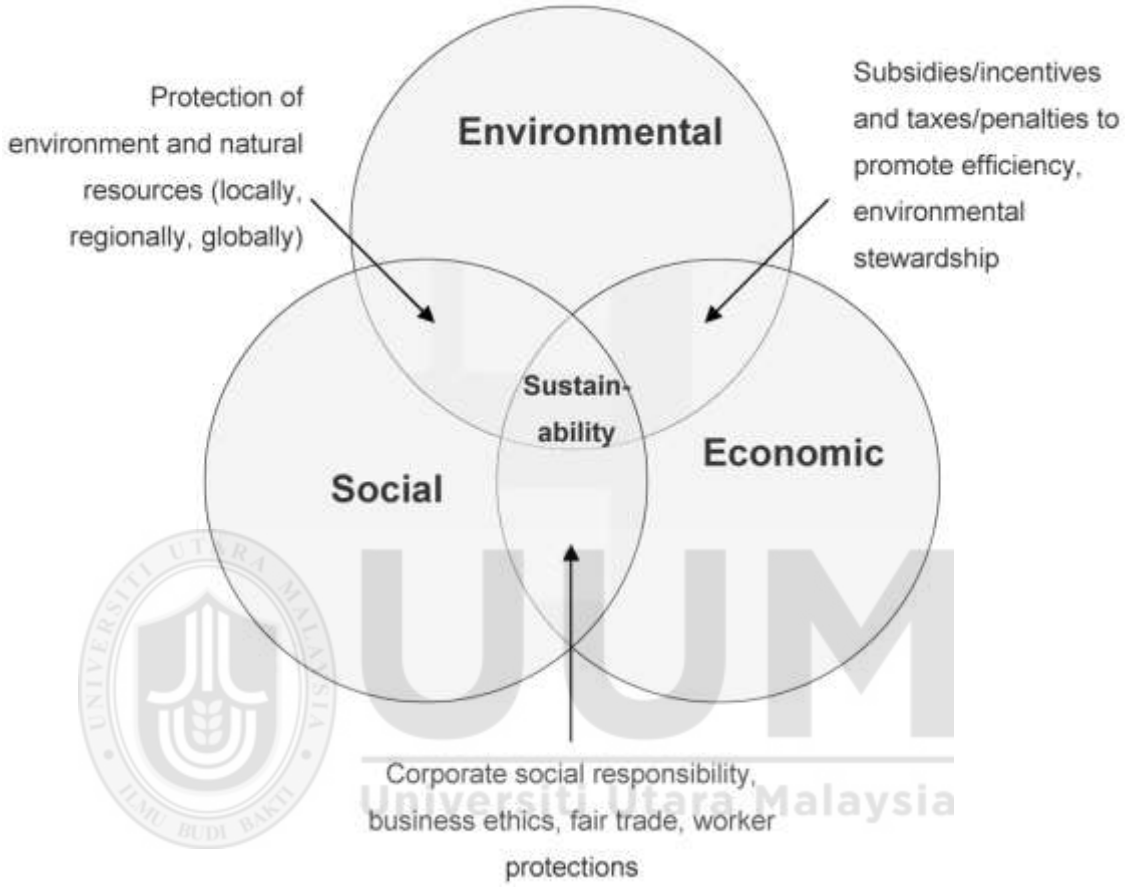


Figure 2.1
Intersection of Sustainability
Source: Adapted from Rosen and Kishawy (2012)

2.3 Knowledge Management

Knowledge has been identified as a vital resource for the firms to survive in the current dynamic and competitive age (Asrar-ul-Haq, Anwar, & Nisar, 2016; Bollinger & Smith, 2001; Holsapple, Jones, & Leonard, 2015; Ragab & Arisha, 2013). Breaking with established theories of the firm in neoclassical economics, knowledge is regarded as a factor to explain the characteristic of firms (Nonaka, Krogh, & von Krogh, 2009), whilst at the same time the emergence of the knowledge economy has called for many existing business firms to recognise knowledge as a source of SCA (Oliver & Reddy Kandadi, 2006; Storey & Barnett, 2000).

With the availability of primary resources like financial capital, human power or raw materials, the competitiveness of the firm focuses less on traditional factors of production (capital, land, and labour) and knowledge has replaced these traditional factors to create wealth in post-industrial business society (Hussain, 2010; Newell, 2014; Sher & Lee, 2004). In particular, knowledge has become an important aspect of economic life and knowledge itself is the main raw material of what we deal, the components with which we work (Stewart, 1997).

More importantly, knowledge cannot be depleted as compared to natural resources and other physical capital. Furthermore, knowledge could be extended and opened to further growth and refinement (Egbu, Hari, & Renukappa, 2005). In the knowledge-based economy, firms have emphasised issues of knowledge assets over traditional assets, and the capability of firms to harness these knowledge assets (Denford & Chan, 2011). As a result, the growing importance of knowledge has resulted in the conceptualisation of the

KM (Oliver & Reddy Kandadi, 2006), subsequently the popularisation of the term of KM (Scarbrough & Swan, 2001).

The quest for acquiring knowledge and effectively managing it is not a new endeavour. KM has emerged as a new discipline in the mid-1990s (Goel, Rana, & Rastogi, 2010; Jonsson, 2015; Newell, 2014). Initially, KM concept was fabricated by Karl Wiig in 1986 during his keynote address for United Nation's International Labour Organisation (Beckman, 1999). Subsequently, KM has received increasing attention among researchers and practitioners (Darroch, 2003; Massingham, 2014; McAdam & McCreedy, 1999). Instead of competing with physical and financial capital, firms that are able to capture the knowledge embedded in their firms efficiently and deploy it into their businesses could attain an SCA over their competitors (Garrido-Moreno, Lockett, & Garcia-Morales, 2015; Storey & Barnett, 2000).

KM is related to the notion of competitive advantage because knowledge serves as the fundamental to both promoting efficiency and innovating, the two essential courses that empower the business organisations to compete (Newell, 2014). Hence, knowledge is a resource normatively which needed appropriate management. Taken as a whole, managing knowledge in a firm is as significant as managing other resources are managed since knowledge resides in the minds of people will corrode easily if it is not well managed (Asrar-ul-Haq et al., 2016). Therefore, managing knowledge effectively is vital for business firms to attain the full advantage of the value of knowledge.

Generally speaking, KM enhances the ability of the firm to compete by recognising and leveraging the firm's collective knowledge (von Krogh, 1998). However, the concept of

knowledge, which lies at the heart of KM having a definition problem as there are a plethora of knowledge definitions (Barley, Treem, & Kuhn, 2018). The issue of defining knowledge has engaged the minds of philosophers and it has led to many epistemological debates (Alavi & Leidner, 2001). In general, knowledge is originated from ideas and opinions about something, in another word; it is a mixture of information, experience, and insight (Hu, 2009). Alternately, some KM scholars, most notably information technology (IT) scholars have tried to distinguish between data, information, and knowledge (Alavi & Leidner, 2001; Maruta, 2014). This computer science approach is based on the idea of data leading to information which in turn leads to the creation of knowledge.

2.3.1 Tacit Knowledge and Explicit Knowledge

There are numerous conceptions about the knowledge available in the literature. The definition of knowledge is a matter of on-going debate in the field of epistemology (Alavi & Leidner, 2001; Gao, Chai, & Liu, 2017). Nevertheless, the definition of knowledge is not a determining factor in managing organisational knowledge in the business firm (Alavi & Leidner, 2001) because it has been treated as a resource in common (Newell, 2014). Organisational knowledge is a collection of knowledge acquired and generated by former and current members of the firm (Maruta, 2014). Besides, organisational knowledge can be viewed as residing in a variety of context varying in their abstraction, visibility, and accessibility (Barley et al., 2018).

Drawing on the work of Polanyi, Nonaka (1994) explained that organisational knowledge could be classified into two types, namely, tacit and explicit knowledge. The tacit/explicit dichotomy is the most widely used in the classification of the types of

organisational knowledge (Ragab & Arisha, 2013) and perhaps the most prominent distinction regarding the character of organisational knowledge (Barley, Treem, & Kuhn, 2018). According to Nonaka et al. (2000), explicit knowledge can be formally and systematically communicated in the language while the tacit knowledge is highly personal and hard to formalise. Whereas explicit knowledge can be shared in the form of data, scientific formulae, specifications, manuals but tacit knowledge is hard to communicate with others since tacit knowledge is deep-rooted in action, procedures, routines, commitment, ideas, value and emotions (Nonaka et al., 2000). Table 2.1 provides the comparison of properties of tacit versus explicit knowledge.

Table 2.1
Comparison of properties of tacit versus explicit knowledge

Properties of tacit knowledge	Properties of explicit knowledge
Ability to adapt, to deal with new and exceptional situations	Ability to disseminate, to reproduce, to access and re-apply throughout the organisation
Expertise, know-how, know-why, and care-why	Ability to teach, to train
Ability to collaborate, to share a vision, to transmit a culture	Ability to organise, to systematise, to translate a vision into a mission statement, into operational guidelines
Coaching and mentoring to transfer experiential knowledge on a one-to-one, face-to-face basis	Transfer knowledge via products, services, and documented processes

Source: Adapted from Dalkir (2011)

Explicit and tacit knowledge that are residing in the business firms can lead them to sustain the competitive advantage if firms are capable of extracting the value from the knowledge (Lee, Lanting, & Rojdamrongratana, 2016). Based on these two dimensions of knowledge, Nonaka and Takeuchi (1995) formulated SECI model (see Figure 2.2) based on this dichotomy and identified four basic patterns of knowledge creation that referred to the pattern of knowledge creation as the spiral of knowledge such as: from tacit to explicit; from explicit to explicit; from tacit to explicit and; from explicit to tacit.

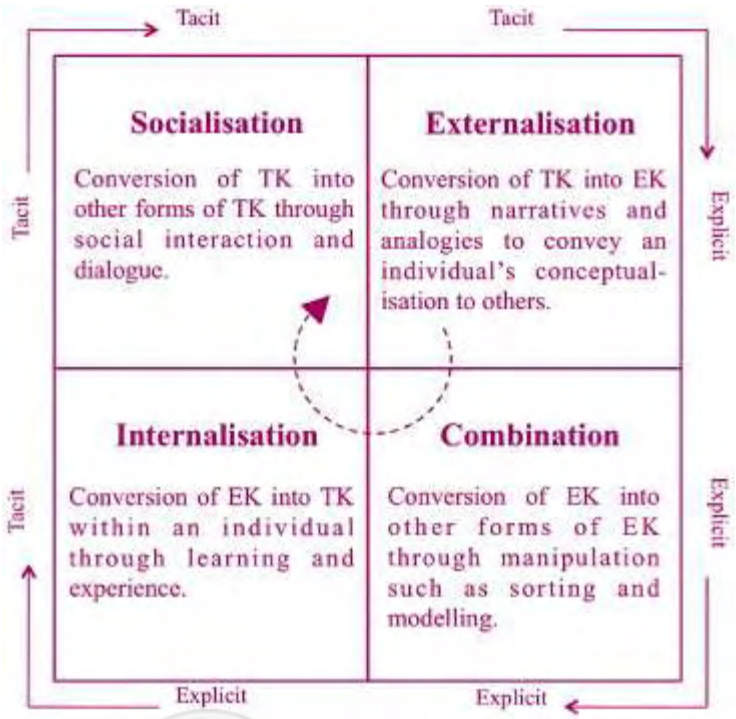


Figure 2.2
The SECI Model
Source: Adopted from Ragab and Arisha (2013)

2.3.2 Conceptions of Knowledge Management

The concept of KM is having definition problem as there are diverse perspectives of knowledge which in turn contribute to the numerous definitions of KM (Lew, Tan, & Abdul Razak, 2013). The concept of KM is not straightforward because this subject has been studied by several disciplines and different approaches (Heisig, 2015; Serenko & Bontis, 2013; Serenko & Dumay, 2015). Given the abstract nature of the subject area, scholars across different disciplines like such as management information systems, strategic management, human resources, organisational behaviour, marketing, library and information science, and sociology are working on KM studies based on their respective disciplines (Serenko & Dumay, 2015).

Inevitably, definitions of KM depend to the purposes for which they are intended (Quintas, Lefrere, & Jones, 1997) and KM has been utilised as an umbrella term for different KM initiatives (Barley et al., 2018). From the business perspective, KM is considered as a capability and business firms manage their knowledge assets in order to create value that is sustainable over time (Gold, Malhotra, & Segars, 2001). Newell (2014) states KM comprises of a set of processes to capture/store/share and use of knowledge to enhance the performance and competitiveness. According to Dalkir (2011), KM is based on two core activities which are capturing and documenting of individual explicit and tacit knowledge in the firm, followed by the dissemination of the knowledge in the firm.

Moving forward, a substantial number of KM studies have shed light on the effects of information technology on KM as KM involves at least some use of information technology. Hence, KM is also considered as information accessibility from the information technology perspective. According to Bharati, Zhang, and Chaudhury (2015), KM nowadays is linked to information technology. Information technology plays an essential role in KM by offering the potential knowledge repository and communication between the individual and the expert with relevant tacit knowledge (Alavi & Leidner, 2001). The technology is employed as a tool to provide broader access to collective knowledge and facilitate sharing of diverse knowledge (Barley et al., 2018).

However, there is a grey zone between business management and information technology literature dominated by a considerable amount of research on the design and implementation of KM information system (Ragab & Arisha, 2013). In some cases, KM

information systems came to a halt in total failures and resulted in a massive loss in the investment in the information system infrastructures (Storey & Barnett, 2000). The substantial reporting of various cases of failure of information technology-based KM led to the general perception that KM is not an information technology issue (Ragab & Arisha, 2013).

Thereby, scholars had argued that information technology is just a facilitator or enabler for KM initiatives (Alavi & Leidner, 2001; Lee et al., 2016; Nam Nguyen & Mohamed, 2011). This is because KM information systems main focus is to codified explicit knowledge and makes it widely available to members of the firm. However, it tends to ignore the tacit knowledge which is embedded in people minds (Storey & Barnett, 2000). Furthermore, KM depends on cognitive processes implanted in the most complex human brain and requires socio-cultural interactions that information technology remains inadequate to capture (Ragab & Arisha, 2013). In the same way, there is a limitation to what information technology could have a contribution in KM processes in an organisation when the information technologies involved are not being accepted by the end users (Davenport & Prusak, 2000).

Additionally, the study of KM information system in most of the information technology literature has been documented from the process-based approaches (Panda & Rath, 2018). Hence, firms have to focus on KM processes that would best use organisational knowledge-based capabilities to address its strategic needs. KM is viewed as a process-based approach which involves different activities (Alavi & Leidner, 2001; Quintas, Lefrere, & Jones, 1997). Although KM is understood as processes in a business firm which can be captured, created, transferred, stored and retrieved, KM processes

happen spontaneously in a business firm regardless whether a formal KM processes have been put in place (Andreeva & Kianto, 2012; Mahdi, Nassar, & Almsafir, 2018; Wee & Chua, 2013). Besides, a vast number of KM processes that have been introduced by scholars during the past two decades (Gao, Chai, & Liu, 2017).

Despite the intense discussion on processes or activities in managing knowledge, there is little consent as to what KM processes should encompass (Wee & Chua, 2013). Several previous studies have reviewed KM (e.g., Alavi & Leidner, 2001; Gao, Chai, & Liu, 2017; Heisig, 2009), yet, Heisig's (2009) study is one of the most comprehensive reviews which had been done within this domain of KM literature (Inkinen, 2016). In the comprehensive survey of 160 KM frameworks, Heisig (2009) had identified the five most common frequently mentioned broad categories of KM processes, namely knowledge acquisition, knowledge creation, knowledge utilisation, knowledge storage, and knowledge sharing (Heisig, 2009). These processes are per detailed separately as follow.

2.3.3 Knowledge Management Processes

Knowledge acquisition process is a process of identifying and eliciting knowledge that is essential to its business activities from its existing sources (Rusly, Sun, & Corner, 2015). Knowledge can be derived from different origins and relate to a wide-ranging of issues facing a firm (Darroch, 2003). For instance, knowledge can be acquired from the employees, other firms, suppliers and customers. In other words, knowledge acquisition is where useful knowledge is gained, collected and obtained by business firms internally or externally to perform their jobs (Tan & Wong, 2015).

Knowledge creation relates to "the development of new ideas that reflect a significant elaboration or enrichment of existing knowledge"' (Mitchell & Boyle, 2010, p. 69). It is the ability to amplify the knowledge residing in the individuals and internalised as part of the organisation's knowledge base (Inkpen & Dinur, 1998). More specifically, knowledge creation is developing new ideas to be used by individuals and business firms through the social interactions of explicit and tacit knowledge (Nonaka et al., 2000). Besides, the process of knowledge creation is perceived as a continuous process happening through the interplays between individuals and their environment (Nonaka et al., 2000).

Knowledge utilisation is to make practical use of existing knowledge/knowledge acquired by adopting or practicing the best practices in their daily tasks (O'Dell & Grayson, 1998). The process of knowledge utilisation is directed towards promoting the realisation of knowledge (Gold et al., 2001). It also helps to promote the use of knowledge to minimise duplication efforts and avoid recurrent mistakes (Wee & Chua, 2013). In other words, knowledge utilisation makes use of the knowledge in a more effective way which in turn generates more value from it (Bhatt, 2001).

Knowledge storage enables the business firms to store, integrate, and reuse the information again in the future (Lai, Huang, Lin, & Kao, 2011). On the other hand, knowledge storage is related to organisational memory which constitutes an important aspect of effective KM (Alavi & Leidner, 2001) while the organisational memory denotes the stored knowledge that can be utilised for decision making (Walsh & Ungson, 1991). Therefore, practical storage and retrieval mechanisms permit the organisation to

conveniently access knowledge (Gold et al., 2001) and it also serves as the prevention of losing important information (Lee, Leong, Hew, & Ooi, 2013).

Knowledge sharing is described as "the act of making knowledge available to others within the organisation" (Ipe, 2003, p. 341). Likewise, Bartol and Srivastava (2002) defined knowledge sharing as the sharing of relevant information, ideas, suggestions, and expertise with one another. In other words, knowledge sharing between individuals is the process by which knowledge residing in an individual's mind is transformed into an understandable form that can be assimilated and practised by other individuals (Ipe, 2003).

2.4 Management Innovation

Innovation is imperative for established business firms to overcome increasingly complex and turbulent business landscapes driven by technological changes (Hollen, Van Den Bosch, & Volberda, 2013). Innovation has become the lifeblood challenge for all types of firms (Andreeva & Kianto, 2011; Hollen et al., 2013; Vaccaro, Jansen, Van Den Bosch, & Volberda, 2012) and it is regarded as an idea essential to sustain competitive advantage (Damanpour, 2014; Nieves, 2016).

Innovation not only permits business firms adapt to rapid and even disruptive shifts in firms' technological, economic, regulatory, and social environment, it also presents a means for a business firm to actively come out such changes to outperform their competitors (Hecker & Ganter, 2013). As a consequence, a considerable amount of effort is placed in to develop new technological knowledge, new process technologies and new products (Volberda, Van Den Bosch, & Heij, 2013). Innovation is acknowledged as an important social and economic phenomenon that needs further research study (Fagerberg, Martin, & Andersen, 2013).

Despite a substantial body of literature is being generated on the topic of innovation for the past 40 years (Basile & Faraci, 2015), the existing literature does not come out with a single definition of innovation (Pino, Felzensztein, Zwerg-Villegas, & Arias-Bolzmann, 2016). However, there is a consensus that innovation is the introduction of novel or improved products, services, processes, marketing, and organisational methods to enhance results and performance in a business firm (OECD, 2005). Innovation research has come to light as a field of research in the mid-twentieth century and many research projects targeted at coming up with a piece of reliable and systematic

knowledge about innovation and how to completely utilise the outcomes of innovation (Fagerberg et al., 2013).

2.4.1 Conceptualisation of Innovation

Innovation in firms has been conceptualised in numerous different ways by Schumpeter's work that leads to various definitions and typologies (Damanpour & Aravind, 2012). Of the current innovation typologies, the Oslo Manual of the Organisation for Economic Co-operation and Development (OECD) classification of innovation is widely adopted by researchers (Camisón & Villar-López, 2014). Oslo Manual differentiates four types of innovations, namely product, process, marketing and, organisational innovation (OECD, 2005).

Product and process innovations are associated with the Schumpeter's early work on the role of new products and new methods of production (Damanpour & Aravind, 2012; Walker et al., 2015). Damanpour (2010) described product innovation as the introduction of new products or services to satisfy the external user needs. On the other hand, process innovation is defined as introducing new features into a firm's production or service operation in order to manufacture a product or provide service in a more efficiently and effectively way (Damanpour, 2010). Product innovation and process innovation are typically linked with the improvement or application of new technologies and often referred to as technological innovations (OECD, 2005). Innovation is viewed as technological innovation when it is underpinned or facilitated by technology (Lopes, Vieira, Barbosa, & Parente, 2017). Technological innovation is directly associated with the key activities in the firm and brings changes in hard technologies (Tether & Tajar, 2008).

Marketing innovation is the employment of an innovative marketing concept or strategy (OECD, 2005). While an organisational innovation is the transformations in internal organisational structure and practices that promote organisational change (Damanpour & Aravind, 2012), these innovations are often called non-technological innovations since both are not associated with any improvement or application of new technologies (OECD, 2005). In other words, non-technological innovation is indirectly associated to the firm's fundamental work activity and brings changes in communication and collaboration processes within the business firm and the process of interaction between them (Tether & Tajar, 2008).

Although the innovation research is distinguished by multidisciplinary, the notion of innovation has conventionally linked with the technological innovation (Birkinshaw, Hamel, & Mol, 2008; Hecker & Ganter, 2016; Hervas-Oliver et al., 2017; Lopes et al., 2017). Nevertheless, past studies of innovation carried out by economist and technology management scholars have concentrated on new products and new methods of production typologies (Basile & Faraci, 2015; Damanpour & Aravind, 2012). Nonetheless, innovation is not limited to the development of new technological innovation (Ganter & Hecker, 2014). Moreover, non-technological innovations can strengthen firm performance as technological innovation posits to do (Damanpour, 2014).

2.4.2 Non-technological Innovation

Contrast with technological innovation, non-technological innovation as a driver of organisational competitiveness has not been recognised as compared to technological innovation (Camisón & Villar-López, 2011; Walker et al., 2015). As compared to

technological innovations, few innovation studies have focused on taking advantage of new markets, new sources of supply, and new ways to organise business typologies despite the prominence of research on innovation in organisation ahead of the realm of technology (Damanpour, 2014; Volberda, Van Den Bosch, & Mihalache, 2014).

A survey on a sample of 524 articles published in ten leading business and economic journals from 1981 to 2008, Crossan and Apaydin (2010) reported only 3 per cent of reviewed papers were dealing with innovation in administrative processes and management practices. While Keupp, Palmié, and Gassmann (2012) proclaimed, only 25 out of 342 studies published in seven strategic management related journals from 1992 to 2010 have focused on non-technological innovation. This indicated that innovation had been conceptualised predominantly as a technology-based aspect instead (Damanpour, 2014).

As competition becomes stiffer and the pace of technological change speeds up, business firms can enhance their SCA by focusing on non-technological innovations (Vaccaro et al., 2012). Hamel (2006) had concluded that only non-technological innovation could create a long term competitive edge. This is because non-technological innovations are most often tacit and able to accelerate changes including the technical innovation that improve the firm's competitiveness (Lin, Su, & Higgins, 2016). According to Lam (2005), non-technological innovations are indispensable for shaping an environment of creativity, learning, and change in the business firm and thus act as a prerequisite for introducing technological innovations. In other words, non-technological innovation is often viewed as a necessity for the introduction of technological innovations (Damanpour, 2014). This is mainly due to technological

innovation is not able to create and maintain a competitive edge in the rapid development of science and technology because they are rather easy to imitate as they usually result in a tangible product.

Camisón and Villar-López (2014) pointed out the importance of non-technological innovation as a different innovation type has only come out in the past ten years after the OECD (2005) published the Oslo Manual which differentiates four types of innovations, namely product, process, marketing and, organisational innovation. Thus far, the literature on non-technological innovations is not concentrated (Armbruster et al., 2008; CamisÉn & Villar-López, 2011; Camisón & Villar-López, 2014). Nevertheless, non-technological innovations include marketing innovation and organisational (or management) innovation are getting more attention (CamisÉn & Villar-López, 2011; Ganter & Hecker, 2014; Hecker & Ganter, 2016; Hervas-Oliver et al., 2017; Lopes et al., 2017; Nieves & Segarra-Ciprés, 2015).

The increasing focus on non-technological innovation may be due to the growing realisation that innovative procedures to management and organising could enhance firm performance (Volberda et al., 2014). Even so, the introduction of non-technological innovation precedes the conceptualisation of technological innovation (Damanpour, 2014) and it has been recognised as administrative innovation, management innovation (MI), and organisational innovation in the past literature (Damanpour, 2014; Volberda et al., 2013). These three terms have been conceptualised in contrast to technological innovations and they considerably overlap (Damanpour, 2014; Damanpour & Aravind, 2012).

According to Volberda et al. (2013), administrative innovation is a subset of organisational innovation in which administrative innovation links with a conservative range of innovations which it involves the managerial capabilities that facilitate organisations to enhance the productivity of their administrative processes and systems (Damanpour, 2014) and it excludes the marketing and operations management (Birkinshaw et al., 2008). MI refers to the change in the way the work of management is accomplished (Hamel, 2006). Oftentimes, organisational innovation has been adopted as a general term that includes the pursuit of any innovative activity within the firm (Crossan & Apaydin, 2010).

However, these three terms are not interchangeable (Volberda et al., 2013) although they are overlapping significantly (Camisón & Villar-López, 2014; Damanpour & Aravind, 2012). Given that the domain of non-technological innovations is broad and multidisciplinary, the conceptualisations of non-technological innovations have impeded its understanding and development (Damanpour, 2014). Hence, the definitions of organisational, administrative, and managerial innovation are viewed broadly as MI (Damanpour, 2014; Hervas-Oliver et al., 2017) and the term MI has recently overtaken other terms (i.e., administrative innovation and organisational innovation) for describing non-technological innovations in the social science literature (Černe, Jaklič, & Škerlavaj, 2016; Damanpour, 2014).

Hence, the present study adapts the terminology and definition introduced by Birkinshaw et al. (2008). They defined MI as "invention and implementation of a management practice, process, structure, or technique that is new to the state of the art and is intended to further organisational goals" (Birkinshaw et al., 2008, p. 825). In

other words, MI refers to the introduction of new management practices, processes, and structures that are intended to further organisational goals (Birkinshaw et al., 2008; Hamel, 2006; Mol & Birkinshaw, 2009). Also, Birkinshaw et al. (2008) have offered a discussion on MI that will probably become the fundamental for research in the MI (Mol & Birkinshaw, 2014; Nieves & Segarra-Ciprés, 2015) and there was a growing number of studies addressing MI after the publication of their article. Table 2.2 provides several definitions of MI.

Table 2.2
Definitions of MI

Study	Definition
Kimberly (1981)	". . . any program, product or technique which represents a significant departure from the state of the art of management at the time it first appears and which affects the nature, location, quality, or quantity of information that is available in the decision-making process."
Hamel (2006)	"A marked departure from traditional management principles, processes and practices or a departure from customary organisational forms that significantly alters the way the work of management is performed."
Birkinshaw et al. (2008)	"The generation and implementation of a management practice, process, structure, or technique that is new to the state of the art and is intended to further organisational goals."
Mol and Birkinshaw (2009)	"The introduction of management practices that are new to the firm and intended to enhance firm performance."

Source: Volberda, Van Den Bosch and Heij (2013)

According to Hamel (2006), MI is either a distinct change in established management principles that significantly improves the process the managerial work is accomplished. Damanpour and Aravind (2012) stated MI is novel ways to formulate strategy and structured tasks and units, alters the firm's management processes and administrative systems, inspire and reward organisational members, and facilitate firm to adapt and change. Also, MI also associates to innovations in making the decision and setting the directions (Hamel, 2006). Taken together, these innovations are parts of the organisational innovation that establish novel management practices, processes, or structures (Mol & Birkinshaw, 2009; Vaccaro et al., 2012).

The advance of investigation on innovation to another discipline has enhanced the ways to the study of MI (Damanpour, 2014). For MI, Birkinshaw et al. (2008) have identified four distinct perspectives from past literature, namely institutional, fashion, cultural and rational. Instead of drawing insight from all four perspectives, Birkinshaw et al. (2008) recognised that research on MI commonly relates to rational approach (See Summary in Table 2.3). First, the institutional perspective focuses on the socioeconomic conditions where the new managerial practices or ideas blossom (Basile & Faraci, 2015). Second, fashion perspective relates to the dynamic interaction between the users and management innovator (Abrahamson, 1996). Third, cultural perspective describes how a firm reacts when faced with the introduction of new managerial practice (Birkinshaw et al., 2008). Lastly, rational perspective focuses on the analysis of how to improve the managerial and organisational effectiveness (Basile & Faraci, 2015).

Damanpour (2014) also pointed out the research avenue of innovation in organisations was advocated by the organisational economics theories at the beginning, hence,

Damanpour (2014), in turn, considered mostly the rational as the dominant theoretical perspective which including learning theories, RBT, and DCV. For example, the RBT highlights the roles of external and internal resources and the firm's capability to combine them to gain SCA (Barney, 2001b). Besides, DCV also implies that innovating across the organisation's capabilities could make reinforce the organisation's ability to build, reconfigure, and integrate internal and external competencies to handle the environmental changes (Teece et al., 1997).

Based on institutional theory and neo-institutional theory, Damanpour (2014) also considered the fashion perspective and referred it as management fashion perspective for parsimony. Institutional theory highlights the function of institutional features such as compliance pressures from governments, parent organisations, and network members on managerial decisions. On the other hand, neo-institutional theory presuming that business firms in a population are ambiguous about the benefits of new management techniques and practices and are thus affected by other business firms in their population to adopt the new management techniques and practices. Therefore, the business firms adopt MI mainly for the sake of the symbolic value of the innovation.

Despite MI concepts are singular in terms of emphasis, it is a heterogeneous phenomenon and should be studied separately from another type of innovations (Lopes et al., 2017). Besides, recent research on MI suggests it is an imperative source of SCA (Mol & Birkinshaw, 2009; Steiber & Alänge, 2015; Vaccaro et al., 2012). Despite the growing evidence that MI can lead a firm to sustain its competitive advantage, it is not well understood and under-studied compared to technological innovation (Hollen et al.,

2013; Walker et al., 2015). Therefore, more studies on MI need to be conducted to advance the knowledge in MI.

Table 2.3

Key Features of Four Perspectives on MI

Features	Institutional Perspective	Fashion Perspective	Cultural Perspective	Rational Perspective
Core question	What institutional conditions give rise to the emergence and diffusion of management innovations?	How do aspects of the supply of and demand for new management ideas affect their propagation?	How do management innovations shape, and get shaped by, cultural conditions inside an organisation?	What is the role of managers in inventing and implementing new management practices?
Key factors influencing the innovation process	Institutional conditions and attitudes of major groups of influencers	Suppliers of new ideas and the legitimacy of their proposals	Culture of the organisation in which the innovation is introduced	Actions of key individuals driving the process inside or outside the organisation
Level of Analysis	Firm plus industry/ country	Firm plus industry/ country	Firm plus individual	Individual plus firm
Process of change and outcome of innovation	Progressive changes in management ideology and/or practice, sometimes toward more effective ways of working	Cyclical process of hype then disillusionment; no evidence that innovation leads to long-term benefits	Socially constructed change process; usually very little change in way of working and perpetuation of existing power relations	Progressive changes in management practice toward more effective ways of working; success not guaranteed

Source: Adapted from Birkinshaw et al., (2008)

2.5 Dynamic Capabilities

Past literature (e.g., Teece, 2007; Teece, Pisano, Shuen, & Winter, 1997) had indicated that some firms flourished in a dynamic environment when others failed. Various concepts and models have been developed to explain this issue and DCs perspective has turned out to be one of the most conventional theoretical lenses in strategic management research over the past decades (Di Stefano, Peteraf, & Verona, 2010; Schilke, 2014; Schilke, Hu, & Helfat, 2018).

Firms operate in a challenging and dynamic business landscape faced with difficulties in sustaining their competitiveness (Singh & Rao, 2016). Furthermore, firms that have gained competitive advantage may not be sustainable in the long run (D'Aveni, Dagnino, & Smith, 2010; Li & Liu, 2014). This can be explained by the notion of the DCs perspective, which is believed to be an essential element for firms' growth, survival, and competitiveness (Teece, 2007). Dynamic capability is the ability of business firms to sense, seize opportunities and reconfigure their business process to meet changing business landscape and subsequently sustain their competitive advantage (Teece, 2007). In other words, DCs perspective helps us understand how a firm's resources can be utilised to help them evolve and sustained their competitive advantage over their rivals (Ambrosini & Bowman, 2009).

Helfat and Peteraf (2009) and van Reijsen, Helms, Batenburg, and Foorthuis (2015) described the concept of DCs which is coined by Teece, Pisano, Shuen, and Winter (1997) as the Holy Grail of strategic management. Although some antecedent references to the concept of DCs can be found in the literature, Teece et al. (1997) brought in this concept which is rooted in the RBT and evolutionary economics in a way that can

probably elucidate not only why firms exist, but also their scope and potential for growth and sustained performance in highly competitive markets. In particular, DCs perspective is an extension of RBT and it can be evaluated based on the assumptions that resources which are VRIN as the underlying for the firms to achieve SCA (Ambrosini & Bowman, 2009; Barney, 2001; Schilke, 2014; van Reijsen et al., 2015). In addition, business firms must build DCs over time as firms' capabilities are context specific and embedded with organisations (Helfat & Martin, 2015).

Nonetheless, RBT is considered to be static because it does not attempt to explain why some firms can achieve SCA in rapidly changing environments (Arend & Bromiley, 2009; Wilden et al., 2016). Teece, Pisano and Shuen used the evolutionary economics perspective concerning routines processes to explain these phenomena (Barreto, 2010; Schilke et al., 2018). As business firms turn their freshly discovered processes into routines, the managerial involvement is enlightened for the further reconfiguration of resources usage, and this led to developing new paths and positions that are built on their unique resource base (Mathews, 2002). In particular, the DCs of firms enable them to respond to changes in the business environment by switching operational capabilities that require substantial managerial involvement (Arend & Bromiley, 2009; Wernerfelt, 1984).

2.5.1 Development of Dynamic Capabilities

By combining resource-based and evolutionary economics perspective, the concept of DCs undergirds SCA by developing unique value through systematic changes which enable increased firms alignment with the external organisational environment (Di Stefano, Peteraf, & Verona, 2014; Peteraf, Di Stefano, & Verona, 2013). As such, Teece

et al. (1997) suggested a 3P framework (See Figure 2.3) and claimed that the firm's unique asset position and the paths moulded the decision-making and other organisational processes where the competitive edge of that firm lies. Firms that possessed DCs will allow them to transform their competitive advantage into an SCA (Augier & Teece, 2008).

In order to sustain firms' competitive advantage, Teece et al. (1997) asserted that they should continuously adapt, reconfigure and renew their resources and capabilities to address environmental changes. According to Teece et al. (1997), the term "dynamic" denotes the capacity to replace old competencies with new ones in order to remain competitive in the changing business environment. The term capabilities "refer to a firm's capacity to deploy resources, usually in combination, using organisational processes, to effect the desired end" (Amit & Schoemaker, 1993, p. 35). Helfat and Winter (2011) perceived firms' capabilities as their ability of firms to implement a particular activity reliably. Also, Helfat and Winter (2011) opined that organisational capability is in place when "the organisation (or its constituent parts) has the capacity to perform a particular activity in a reliable and at least minimally satisfactory manner" (p. 1244).

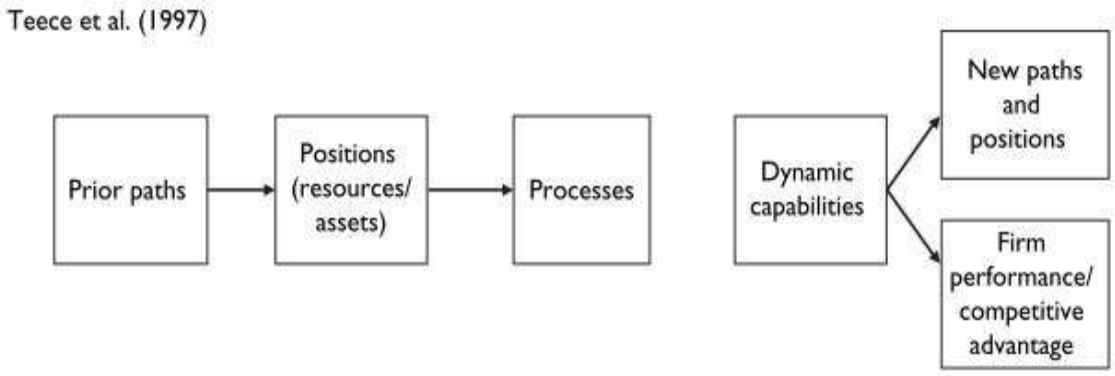


Figure 2.3
Teece et al's 3P Framework on DCs
Source: Adopted from Helfat and Peteraf (2009)

The theoretical framework suggested by Teece et al. (1997) emphases only explain what firms do instead of why they are doing so (Li & Liu, 2014). Teece (2007) applied the same chain of logic to develop his previous works by focusing on particular types of DCs. He proposed a new theoretical framework by integrating three types of orchestration processes namely sensing, seizing and reconfiguration into the new framework (See Figure 2.4). According to Teece (2007), firms can develop new positions and paths through continuous proactive and reactive changes by identifying the opportunity (sensing) and investing in these opportunities (seizing). Subsequently, DCs for recombination or reconfiguration lift the firms into another level which in turn result in a positive effect on firms' performance and competitive advantage, new positions and directions (Teece, 2007). Taken together, firms' abilities to organise their competencies and resources while exploiting existing internal and external firm-specific competencies to address fluctuating environment should place firms in a better position to achieve SCA (Teece, 2007; Teece et al., 1997).

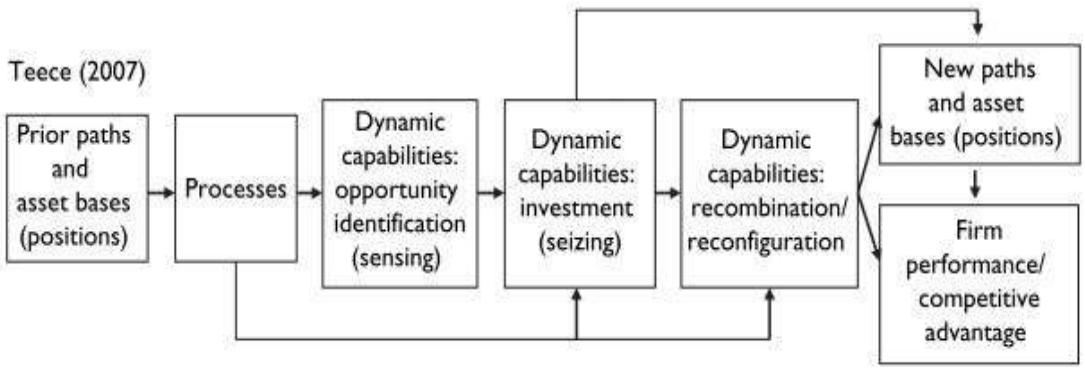


Figure 2.4
Teece's New DCs Framework
Source: Adopted from Helfat and Peteraf (2009)

On the other hand, Eisenhardt and Martin's article in the year 2000 was considered as a second seminal paper and contributed to the body of knowledge on DCs by challenging the purpose and mechanisms of the Teece et al. (1997)'s framework and delimiting its boundary (Peteraf et al., 2013). Eisenhardt and Martin (2000) pointed out that Teece et al.'s (1997) work is conceptually vague, repetitious and lack of attention to the mechanisms by which resources contribute to SCA. To avoid the redundancy in Teece et al.'s (1997) framework which is anchored with the 3P (i.e., processes, positions, and paths), Eisenhardt and Martin (2000) used organisational theory to reconceptualise DCs by proposing that DCs are a set of specific and identifiable processes such as product development, strategic decision making and alliancing (See Figure 2.5). Furthermore, Eisenhardt and Martin (2000) claimed that these identifiable processes are neither vague nor tautological.

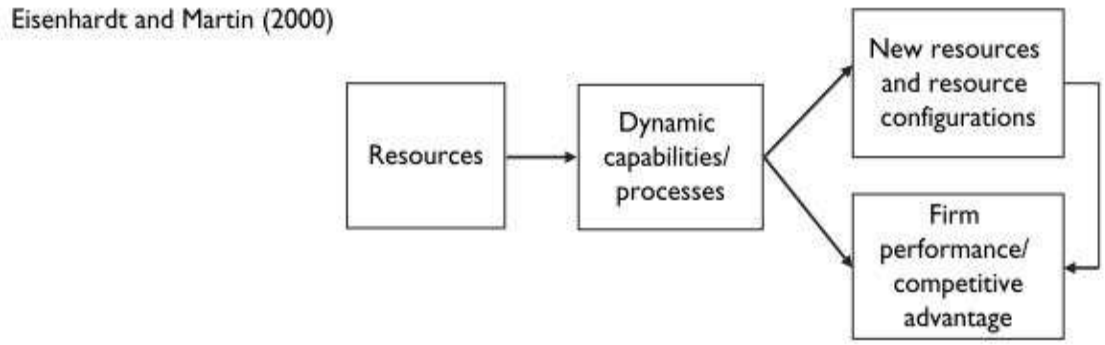


Figure 2.5
Eisenhardt and Martin's Framework on DCs
Source: Adopted from Helfat and Peteraf (2009)

Eisenhardt and Martin (2000) have offered alternative views on DCs by focusing on specific processes and noting that the "commonalities" of DCs made them reasonably useful across the business firms. However, Eisenhardt and Martin (2000) claimed that DCs could not be a source of SCA in a rapid environmental change because DCs are unstable and the duration of competitive advantage is uncertain. This implies that DCs are not necessary conditions for SCA although it indirectly enhances the firm's competitiveness.

Furthermore, Eisenhardt and Martin (2000) also asserted that DCs represent best practices and undergird SCA in a moderately dynamic market. Their view contrasts sharply with Teece et al.'s (1997) that associate DCs directly to the notion of competitive advantage. In contradict, as noted by Teece (2007), "a well understood and replicable best practice is not likely to constitute a dynamic capability" (p. 1321). Hence, it is clear that Teece (2007) did not agree with Eisenhardt and Martin's (2000) claim and explicitly contested that best practices are less likely to constitute a dynamic capability since they will not lead to an SCA.

Despite with the contradictory views in these two seminal papers, it is clear that Teece et al. (1997) and Eisenhardt and Martin (2000) have played their role in the development of DCs research domain (Peteraf et al., 2013) and have made subject of interest to a wide range of researchers in strategy research area. Di Stefano et al. (2014) opined that DCs research domain had been divided into two separate knowledge areas that represent the legacy of Teece et al. 's (1997) and Eisenhardt and Martin's (2000) works. In particular, the two seminal papers on DCs represent not only different but conflicting understandings based on two mutually exclusive theoretical underpinnings. Besides, they also employ different types of reasoning that yield different conclusions, hence, make different assumptions about the nature of DCs that undergird SCA (Di Stefano et al., 2014; Peteraf et al., 2013).

On the other hand, Peteraf et al. (2013) pointed out that both papers agreed on the role of organisational routines since they involved managerial involvement and processes. Nonetheless, Di Stefano et al. (2014) averred that Teece et al. 's (1997) and Eisenhardt and Martin's (2000) works had profoundly affected the evolution of DCs as a research domain in ways that remain to be problematical. More specifically, the contemporary concerns that are associated with a lack of consent to the basic theoretical foundations (Easterby-Smith, Lyles, & Peteraf, 2009; Schilke, 2014). However, Teece (2014) claimed that the subdividing of two contradicting views could be bridged based on Peteraf et al. (2013) who recognised that Eisenhardt and Martin's (2000) work focused on ordinary capabilities (i.e., best practices) instead of DCs.

2.5.2 Ordinary Capabilities and Dynamic Capabilities

In order to appreciate the uniqueness of the DCs, it is imperative to acknowledge that business firms' capabilities can be distinguished as ordinary and dynamic capabilities (Fainshmidt, Pezeshkan, Lance Frazier, Nair, & Markowski, 2016; Schilke et al., 2018; Teece, 2014). There are conceptual differences between these two capabilities (Laaksonen & Peltoniemi, 2016). The ordinary capability is also known as operational/zero-order in the DCs literature (Teece, 2014). Ordinary capabilities allow a business firm to make a living at the moment, whereas DCs enable a business firm to makes it living (Winter, 2003; Zollo & Winter, 2002). Table 2.4 lays out the fundamental distinctions between ordinary capabilities and DCs.

Table 2.4
Some Differences between Ordinary Capabilities and DCs

	Ordinary capabilities	Dynamic capabilities
Purpose	Technical efficiency in business functions	Achieving congruence with customer needs and with technological and business opportunities
Mode of attainability	Buy or build (learning)	Build (learning)
Tripartite schema	Operate, administrate, and govern	Sense, seize, and transform
Key routines	Key routines	Signature processes
Managerial emphasis	Cost control	Entrepreneurial asset orchestration and leadership
Priority	Doing things right	Doing the right things
Imitability	Relatively imitable	Inimitable
Result	Technical fitness (efficiency)	Evolutionary fitness (innovation)

Source: Adopted from Teece (2014)

More specifically, ordinary capabilities involve administrative, operational, and governance-related functions from the technical aspect that are required to perform the tasks (Teece, 2014). Whereas the DCs permit the firm to alter the resource base, change ordinary capabilities, and/or initiate change in the organisation's external environment (Arend & Bromiley, 2009; Helfat & Winter, 2011; Teece, 2007). In other words, DCs facilitate the repeated and reliable performance of an activity that is directed to strategic change in the business firms (Helfat & Winter, 2011; Winter, 2003). Besides, Helfat and Winter (2011) indicated that DCs also provide the capacity for a business firm to shape its external environment. For example, transforming regulations, technological standards, pattern, and other institutions within the business ecosystem (Teece, 2007). As such, DCs can be considered as an unequivocal subset of organisational capabilities that can effect change in the firm's existing resource base, its ecosystem, and external environment, as well as its strategy (Schilke et al., 2018).

2.5.3 Definitions of Dynamic Capabilities

Moving forward, the definition of DCs has evolved as the research progresses (Helfat & Peteraf, 2009). However, Barreto (2010) had identified the inconsistent definitions of DCs after reviewed 38 studies published in eight leading management journals. Barreto (2010) argued that the definitions of DCs often differ regarding their nature, role, context, heterogeneity assumptions, and purpose. In a similar vein, Di Stefano et al. (2014) indicated that there is a bifurcation of the definition of DCs resulting in a differing view of Teece et al. 's (1997) and Eisenhardt and Martin's (2000) works that start to split understandings of the most fundamental components of the DCs research.

In general, DCs have been defined based on two conceptions, namely latent actions (i.e., abilities or capacities) and constituent elements (i.e., processes or routines) in the DCs literature (Barreto, 2010; Di Stefano et al., 2014). The fundamental distinction between these two notions is the level of observability (Di Stefano, Peteraf, & Verona, 2014). In particular, an action that is latent can be observed when called into use, while constituent elements have a more concrete and observable form (Helfat et al., 2007).

Teece et al. (1997) defined DCs as "the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments" (p. 516). On the other hand, Eisenhardt and Martin (2000) defined DCs as "The firm's processes that use resources—specifically the processes to integrate, reconfigure, gain and release resources—to match and even create market change" (p. 1107). Besides, Helfat et al. (2007) build on these seminal works (i.e., Eisenhardt and Martin, 2000 and Teece et al., 1997) and define DCs as the "capacity of an organisation to purposefully create, extend, or modify its resource base" (p. 4).

However, the DCs defined by Teece et al. (1997) was too broad to allow others to refine, reinterpret and expand the concept (Easterby-Smith et al., 2009). Several other researchers proposed alternative conceptualisations of DCs focusing on distinct DCs. In similar vein with Eisenhardt and Martin (2000), Zollo and Winter (2002) defined DCs as defined as routinised activities which lead to the development and adaptation of operating routines in pursuit of improved effectiveness. Meanwhile, Zahra, Sapienza, and Davidsson (2006) highlighted DCs as the firm's abilities to rearrange its resources and routines in the manner envisioned and deemed appropriate by its principal decision-maker(s). Wang and Ahmed (2007) perceived DCs as the firm's constant behavioural orientation in integrating, reconfiguring, renewing, and recreating its resources and capabilities.

Joint efforts of a group of key scholars in DCs domain who include Helfat, Peteraf, Teece, Winter and other top scholars have redefined DCs in a more precise way to eliminate inconsistencies and provide some suggestions for measuring DCs (Ambrosini & Bowman, 2009). They defined DCs as the capacity of a firm to purposefully create, extend, or modify its resource base. In their new definition, Helfat et al. (2007) provided a slightly different explanation to Teece et al. (1997) with an addition of a word "purposeful" to define DCs in order to manifest the intention of the DCs explicitly (Helfat & Peteraf, 2009). According to Easterby-Smith et al. (2009), the definition proposed by Helfat et al. (2007) is much more detailed and permit researchers to study more about the nature and origins of DCs. Based on Barreto's (2010) synthesis of the DCs literature, he suggested that "dynamic capability is the firm's potential to systematically solve problems, formed by its propensity to sense opportunities and

threats, to make timely and market-oriented decisions, and to change its resource base" (p. 271).

Beyond the theoretical foundations involving DCs, a magnitude of studies has made significant progress that provides knowledge in the field of DCs (Schilke et al., 2018). Work in the field has moved from theoretical works to more structured empirical modelling and testing (Schilke et al., 2018; Wilden et al., 2016). Despite the progress made on research related to DCs domain to date, these effort were criticised for creating confusion over the effectiveness of measurement being employed to measure DCs (Laaksonen & Peltoniemi, 2016; Schilke, 2014; Shafia, Shavvalpour, Hosseini, & Hosseini, 2016; Wilden et al., 2016). This is because DCs manifest themselves in various distinct forms (Eisenhardt & Martin, 2000; Helfat & Winter, 2011; Helfat et al., 2007). Hence, DCs scholars have developed different ways to operationalise the DCs construct and these different approaches have contributed much richness and nuance to our understanding of what constitutes DCs (Schilke et al., 2018).

For organisation process-based typology, Teece (2007) proposed DCs can be categorised according to their capacity: to sense and shape opportunities and threats, to seize opportunities, and to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business firm's intangible and tangible assets. This organisation process-based typology of sensing and seizing new opportunities, and reconfiguring has been widely used (Schilke et al., 2018). For instance, as no readily available scales for operationalising DCs exist, Wilden, Gudergan, Nielsen and Lings (2013) started with Teece's (2007) conceptualisation of DCs and developed constructs to measure DCs. In a similar vein, Pavlou and El Sawy (2011) and

Aminu and Mahmood, (2015) operationalised DCs as four difference capabilities, namely sensing, learning, integrating and coordinating.

Another common way to operationalise DCs in the past empirical literature is using functional typology to study specific functional domains and applications within the firms (Schilke et al., 2018). This typology is in line with Eisenhardt and Martin (2000) and Winter (2003) who viewed that DCs refer to specific activities and contexts in which they are employed. For instance, Schilke (2014) operationalised DCs as alliance management capability and new product development capability. Similarly, von den Driesch, Eva Susanne da Costa, Christina Flatten and Brettel (2015) operationalised DCs as marketing, research and development (R&D) and production capabilities.

In sum, the DCs approach is potentially beneficial for the business firms in understanding how the DCs undergird an SCA under the conditions of change. Nonetheless, there is confusion over the effectiveness of the definitions and measurements in DCs research. Hence, further research effort is needed as the DCs approach is an emerging area to be explored (Di Stefano, Peteraf, & Verona, 2010; Giudici & Reinmoeller, 2012; Peteraf, Di Stefano, & Verona, 2013; Wilden, Devinney, & Dowling, 2016).

2.6 Perceived Environmental Dynamism

A business firm's external organisational environment comprises of competitors, customers, and suppliers that the business firm interacts (Dess & Beard, 1984). Hence, external environment is an important component for every business firms (R. Andrews & Johansen, 2012; Daft, Sormunen, & Parks, 1988). However, global crises, disruptive technologies, or business models, and cost pressure require responses from firms to sustain their competitive advantage (Frank, Güttel, & Kessler, 2017). Moreover, cutthroat competition has made matters even worse than ever (Kamasak, Yavuz, & Ozturk, 2017). As a result, business firms often confront with unstable and unpredictable external events (Daft et al., 1988).

An essential topic in the field of strategic management is the concern of how to coordinate a firm's internal resources and capabilities to the challenges that arise from the external environment (Andrews, 1971). In the strategic management literature, the external environment is a key variable that has a substantial impact to business firms and it has been viewed as a critical contingency factor that determines business firms' ability

to sustain their competitive advantage over their competitors (Child, 1972). In other words, the environmental context in which firms operate might augment or diminish firms' SCA associated with firms' resources and capabilities.

Integrating these views, external environment has emerged as one of the major factors for firms to sustain their competitive advantage and they need to renew their resource base and capabilities in line with changes in external business environment in order to sustain their competitive advantage (Teece, 2007; Teece, Pisano, Shuen, & Winter, 1997). Environmental changes often refer to the degree of dynamism in the environmental settings that a business firm faces (Lumpkin & Dess, 2001; Miller & Friesen, 1982). PED is a contextual variable was first discussed in the strategic management literature on its role as a moderator of the relationship between the predictor variable and criterion (Dess and Beard, 1984). More recently, PED has been examined as an essential contingency factor in the relationship with the firm's competitive advantage (e.g., Li & Liu, 2014; Schilke, 2014).

Environmental dynamism is defined as the volatility (rate and amount of change) and uncertainty of business environment (Dess & Beard, 1984; Duncan, 1972; Jansen, Vera, & Crossan, 2009; Miller & Friesen, 1982; Simerly & Li, 2000). According to Dess and Beard (1984), volatility emerges as a consequence of changes in from technological, economic and political powers as well as the changes in the market and industrial contingencies. For example, changes in industry structure, the instability of market demand, and the probability of environmental shocks that could undermine firm's competitiveness (Jansen, Van Den Bosch, & Volberda, 2006; Sirmon, Hitt, & Ireland,

2007). Besides, environmental dynamism maintains the increasing levels of environmental dynamism will lead to greater environmental uncertainty (Duncan, 1972). Environmental uncertainty is described as the unpredictability rising from the inadequacy of clarity in accessing information, the time span for the feedback and the nature of causal relationships (Lysonski, 1985). Similarly, Simon (1955) stated the uncertainty is the difference between projected and actual outcomes as a result of the limited information available for decision making. When the business environment is uncertain, it hard for business firms to respond with the necessary changes, and they will experience sizable levels of volatility in the firm's internal environment (Chen, Zeng, Lin, & Ma, 2017; Palmer & Wiseman, 1999). Specifically, the uncertainty arises from the unpredictability of distinct groups (e.g., suppliers, competition, customers, regulators) in which they combine and form the external environment of a business firm (Duncan, 1972). In other words, the concept of environmental uncertainty is fundamental to understand business firms' boundary spanning activity.

Consequently, environment with low dynamism which is characterised with occasional changes, and those changes that do occur can be anticipated and with a lower rate of change (Duncan, 1972; Schilke, 2014). Conversely, highly dynamic environment is characterised with rapid and discontinuous changes (Droge, Calantone, & Harmancioglu, 2008; Li & Liu, 2014). In a highly dynamic environment, business firms may encounter situations that are ambiguous, and few full-fledged alternatives are available and few clear evaluation criteria when choosing alternative solutions (Li & Simerly, 1998). Thus, external environment factor influences businesses and the way they make decisions (Meinhardt, Junge, & Weiss, 2018). In particular, Li and Simerly (1998) stated that

these factors might compel business firms to come out with the solutions available to them quickly. In this vein, Baum and Wally (2003) found that environmental dynamism leads to faster business decision speed. As a result, the risk of making wrong decisions increases and the possibility of choosing the right courses of alternative decreases (Kamasak, Yavuz, & Ozturk, 2017). Therefore, business firms may face smaller decision windows in the fragmented markets and a highly dynamic environment (Lee, Wu, & Liu, 2013).

In the aggregate, business firms operating under highly dynamic environmental conditions must embrace changes and make necessary adjustments to match with these changes to sustain their competitive advantage over their competitors (Li & Liu, 2014). This situation requires firm to develop and cultivate new skills and capabilities to reduce the associated uncertainties as a result of a highly dynamic environment (Kamasak et al., 2017).

2.7 Underpinning Theories

The field of strategic management focuses on achieving SCA in a business firm (Barney, 2001; Priem & Butler, 2001). In the formulation of a theoretical perspective for studying the SCA, RBT provides a useful underlying mechanism. In general, the RBT has become the dominant theoretical perspective within the strategic management literature and it shifts our attention from the industry to the firm level as a prime determinant on how a firm sustains their competitive advantage over competitors.

Drawing on the RBT, business firms may sustain their competitive advantage over competitors through the acquisition or deployment of tangible or intangible resources and utilise capabilities that are VRIN (Barney, 1995; Barney, 1991; Wernerfelt, 1984). This is essential because the major constructs (i.e., KM, MI, and DCs) are internal capabilities of a firm. Besides, RBT focuses primarily on the internal aspect of the firm. Hence, the RBT is a complementary theory to the industrial organisation view which places the determinants of the competitive advantage at the industry level (Kraaijenbrink et al., 2010; Mahoney & Pandian, 1992). Therefore, KM, MI, and DCs can be viewed as resources which have an important effect on the ability of a firm to acquire SCA.

As a leading theory being used in the literature on competitive advantages, RBT's ultimate goal is to achieve SCA but it has been focused too much on the economic aspect to measure the outcomes (Newbert, 2007). Stakeholder theory is being applied to measure SCA of a manufacturing firm in this study. It is noted the concepts of sustainability, social and environmental responsibility are getting major concern (Ahmad, 2015) and stakeholder theory offers a realistic approach to strategy management that urged firms to be aware of stakeholders in terms of environmental and

social aspects to achieve SCA (Freeman, 1984). According to Laplume, Sonpar, and Litz (2008), business firms should be managed not only in the interest of shareholders but a broader aspect by including the interest of all their constituents.

Besides, the increasingly volatile and turbulence environment contests the original propositions of the RBT which serves as the cornerstones of competitive advantage (Li & Liu, 2014). Rapid environmental changes in the past two decades have led to failures of many firms as their core competencies were easily imitated and became obsolete (Jiang, Mavondo, & Matanda, 2015). As a result, scholars claimed that RBT is neglecting the impact of the external business environment (Eisenhardt & Martin, 2000; Li & Liu, 2014; Priem & Butler, 2001; Wang & Ahmed, 2007). As for these reasons, DCV is developed as an extension to RBT. DCV requires firms to make adjustments or adaptations in business strategy quickly in order to sustain their competitive advantages in a highly turbulent business environment (Teece et al., 1997). Hence, this study attempts to explore the moderating effect of PED on firms' ability to sustain their competitive advantage.

2.8 Summary of Chapter

This chapter has provided an extensive review of the literature related to the key variables of this research (i.e., SCA, KM, MI, DCs, and PED). The review of the literature indicates that current measurements of SCA are vague. The literature also highlighted that KM, MI and DCs are essential for firms to sustain their competitive advantage over their competitors. Nonetheless, there is insufficient understanding of the relationship between the three independent variables and SCA. Researchers have suggested undertaking further research to understand the mechanism between them. The relationship between the independent variables might be influenced by either a mediator or a moderator variable. PED needs to be considered as a moderator underpinned by DCV. The framework of the study, the formulation of hypotheses and the research methodology used to conduct this study will be discussed in Chapter Three.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This study attempted to answer the research questions on the effect of KM, DCs, MI and the intervening impacts of PED to achieve SCA which is measured from three perspectives, namely economic, social and environmental performance. This chapter details the methodology used to examine the variables reviewed and discussed in Chapter Two empirically and to address the research questions discussed in Chapter One. Particularly, the variables reviewed and discussed in Chapter Two were used to develop the research framework of the study and subsequently guided the formulation of hypotheses to answer the research questions discussed in Chapter One. Apart from this, the research methodologies employed to carry out this study were discussed by highlighting the research design, research population and sample, variable operational definitions, questionnaire design, data collection, and data analysis techniques.

3.2 Research Framework

A review of past literature on KM, DCs, MI, PED and SCA in Chapter Two were used to develop the research framework for this study. A schematic diagram illustrating the hypothesised relationships between the variables is presented in Figure 3.1. As presented below, this proposed research framework was developed based on Barney's (1991) RBT. Building on past studies and drawing strength from theoretical models based on RBT, SCA is the dependent variable while the KM, MI, and DCs are the independent variables in this study. Through the integrative review, PED is studied as the moderating variable and examined its moderating effect between the dependent variable and independent variable.

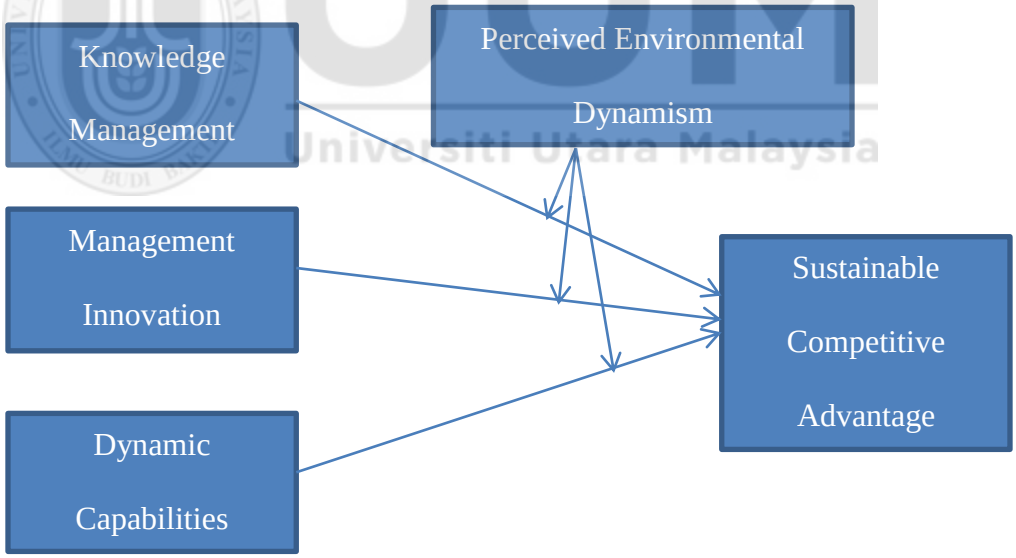


Figure 3.1
Proposed Research Framework

3.3 Hypotheses/Propositions Development

Hypotheses are the predictions of researcher about the anticipated outcomes of relationships among the variables (Creswell, 2014). The hypotheses were tested by employing statistical procedures and inferences about the population drawn based on the data collected from the samples.

3.3.1 Knowledge Management

In the knowledge era, knowledge is recognised as potential resources that undergirds SCA (Hu, Wen, & Yan, 2015; Johannessen & Olsen, 2003; Lubit, 2001; Pais, Mónico, dos Santos, & Almeida, 2014; Yaghoubi, Mahallati, Moghadam, & Rahimi, 2014). The RBT of the firm advocates that knowledge is organisational asset that enables firms to sustain its competitive advantage in hypercompetitive environments. Hence, KM plays a dynamic role in sustaining competitive advantage (Yaghoubi et al., 2014). An organisation should realise how to create, distribute and utilise knowledge and attach knowledge to organisational process in order to gain SCA (Rahimli, 2012).

There are several studies that attempted to establish the linkage between KM and SCA. According to Chuang (2004), KM is significantly related to competitive advantage based on her study on 177 manufacturing firms in Taiwan. Besides, Egbu et al. (2005) conducted a field study which involving eleven SMEs on deploying KM for SMEs to gain sustainable competitiveness. They found that SMEs can attain sustainable competitiveness through effective KM practices.

Apart from this, Goel et al. (2010) conducted a case study on deploying KM as a process to gain SCA in the Indian public sector. They found that KM could improve SCA in the

public sector perspective. Furthermore, Mundra, Gulati, & Vashisth (2011) examined whether KM leads to the competitive edge among Indian IT manager and found KM is necessary for achieving competitive advantage. Hence, knowledge has become the strategic resources in the business firm in today's competitive world (Barney, 1991). According to Nonaka, in the current unstable conditions, the only reliable resource to gain an SCA is knowledge (Nonaka, 1994). Therefore, it is hypothesised that:

H_1: KM processes have a significant effect on the SCA of the Malaysian E&E manufacturing firms.

3.3.2 Management Innovation

MI is perceived to help firms to gain the SCA over their competitors, particularly in the competitive business environment (Hamel, 2006; Huang et al., 2015; Vaccaro et al., 2012). Previous research has found that MI is significant in helping firms to gain SCA (Steiber & Alänge, 2015).

Several studies attempted to establish the linkage between MI and SCA. According to Mol and Birkinshaw (2009), the introduction of new management practice is positively associated with productivity growth based on an empirical study involving 8172 organisations in the United Kingdom. Besides, Camisón and Villar-López (2011) investigated the role of organisational memory and learning capabilities as antecedents to non-technical innovation in 159 industrial firms in Spain. They concluded that non-technical innovation facilitates the achievement of sustained competitive advantage. Similarly, Huang et al. (2015) developed 14 MI–based assessment indicators in three dimensions based on innovation theory of Schumpeter, general equilibrium theory, and

previous literature review to evaluate MI capability of the manufacturing firm and found that MI can enhance competitive advantage. Therefore, it is hypothesised that:

H_2: MI has a significant effect on the SCA of the Malaysian E&E manufacturing firms.

3.3.3 Dynamic Capabilities

Accumulating valuable resources is insufficient to sustain competitive advantages in a fast-changing competitive environment (Lin & Wu, 2014; Teece, 2007; Teece et al., 1997). Some scholars consider that DCs are vital for an organisation to sustain competitive advantage over their competitors and DCs are found to be positively related to long-term performance (Ambrosini & Bowman, 2009; Cui & Jiao, 2011; Helfat & Peteraf, 2009; Helfat et al., 2007; Li & Liu, 2014; Teece et al., 1997; Teece, 2007).

Several studies also attempted to establish the linkage between DCs and SCA. Cui and Jiao (2011) examined the relationship between DCs and SCA in China with the mediation impact of the strategic alliance. The results show that DCs have significant impact on firms' SCA. Li and Liu (2014) also concurred that DCs have a positive effect on competitive advantage based on their study involving 217 organisations in China. Therefore, it is hypothesised that:

H_3: DCs have a significant effect on the SCA of the Malaysian E&E manufacturing firms.

3.3.4 Perceived Environmental Dynamism as Moderator

It is imperative to recognise the presence of subtle influence when examining the relationship between the predictor variable and criterion variable (Eroglu & Hofer, 2014). From DCV perspective, PED is viewed as a critical contingency factor and, this study attempted to explore its moderating effect on firms' ability to sustain their competitive advantage. Obviously, firms' resources possession priorities and unique capability deployment may change in dynamic environments (Cavusgil, Seggie, & Talay, 2007; Kamasak, Yavuz, & Altuntas, 2016). Also, previous literature indicates that environmental dynamism, characterised by rapid change affects the relationship between predictor variable and criterion (eg., Jansen, Vera, & Crossan, 2009; Simerly & Li, 2000). In differing degrees of environmental dynamism, the relationship between the predictor variable and criterion variable may vary (Jiao, Alon, & Cui, 2011). Following this logic, business firms pursuing KM, MI, and DCs may have different effects on the SCA at various levels of environmental dynamism.

Business firms in turbulent market environments are facing challenges to maintain their knowledge base up-to-date (Ambrosini & Bowman, 2009). On top of that, the dynamic environment exerts pressure on a firm due to limitations of the firm's current knowledge (Hung & Chou, 2013). The capability of a firm to deal with the dynamic business environment is related to the firm's KM (Pratono & Mahmood, 2014). In order for firms to sustain competitive advantage in dynamic environmental conditions, they must relentlessly renew their knowledge base to accommodate the environmental change (Helfat et al., 2007; Kraaijenbrink, Spender, & Groen, 2010). Hence, the current study

expected that environmental dynamism would impose a moderating effect that could change the relationship between KM and SCA. Therefore, it is hypothesised that:

H_4: PED has a moderating effect between KM processes and SCA of the Malaysian E&E manufacturing firms.

According to Ryu and Lee (2015), the firm's ability to accommodate changes in business environment are critical factors for superior innovation success. Many attempts to accommodate the environmental dynamism are mainly pertaining to firm's MIs (Ganter & Hecker, 2014). Due to rapid technological development, business firms need to nurture the effective use of MIs in order to sustain their competitive advantage (Steiber & Alänge, 2015). Hence, the current study expected that environmental dynamism would also impose a moderating effect that could change the relationship between MI and SCA. Therefore, it is hypothesised that:

H_5: PED has a moderating effect between MI and SCA of the Malaysian E&E manufacturing firms.

The DCV discusses the fact that resources may lose its value or substitutable in the turbulent environment. This imposes a challenge to the organisation by demanding business firms to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments (Teece, 2007; Teece et al., 1997). In such cases, DCs turn out to be an important aspect for the firm to engage in rapidly changing environments, reconfigure the firm's resources and capabilities to respond to the firm's dynamic market environment (Helfat et al., 2007; Wilden & Gudergan, 2015). Hence, the current study expected that environmental dynamism would impose a moderating

effect that could change the direction of the relationship between DCs and SCA. Therefore, it is hypothesised that:

H_6: PED has a moderating effect between DCs and SCA of the Malaysian E&E manufacturing firms.

In sum, environmental dynamism is a potential contingent factor that impacts on the business firms to sustain their competitive advantage. Therefore, for firms to sustain their competitive advantage, would depend on their ability to cope with the changing environment through effective KM, MI and exploiting the firm's DCs.

3.4 Research Design

Generally, research design is "a master plan that specifies the methods and procedure for collecting and analysing the needed information" (Zikmund, Babin, Carr, & Griffin, 2010, p. 66). Besides, it is important to design the research after the variables had been identified in the problem situation and developed the research framework in order to gather the necessary data and analysed the data to answer the questions (Sekaran & Bougie, 2013). Hence, this study puts forth several methodological remarks which have been identified as the research design of this study.

The research design is the types of inquiry within quantitative, qualitative, and mixed methods methodologies that guide the researchers by providing details direction for procedures in social science research (Creswell, 2014). The current study applied a research design which purportedly suited quantitative methodology to explain the variance explained in the dependent variable as predicted by the independent variables using statistical procedures. Specifically, the current study explained the association between KM, MI, DCs, PED, and SCA.

Deductive reasoning which is mostly used in quantitative studies was applied to this study by starting this study with RBT and then applied other theories to the SCA issues. Deductive reasoning is the fundamental component in the hypothetico-deductive method which involves seven steps of identifying a broad problem area, defining the problem statement, hypothesizing, determining measures, data collection, data analysis, and interpretation of the results (Sekaran & Bougie, 2013). The current study had gone through all the seven steps as stipulated by Sekaran and Bougie (2013).

This study was also in part a descriptive study as it described the phenomena builds upon previous exploratory research and this study focused on determining the associations among the variables (Mooi & Sarstedt, 2011). In addition, it is imperative to have a clear-sight of the phenomenon on which data to be collected before the collection of the data (Saunders, Lewis, & Thornhill, 2012). As such, the study's outcome is the answers to the research questions (Neuman, 2014). In other words, this study described the phenomenon at the time of the study based on the past understandings of the nature of the research problem, which in turn intended for developing empirical generalisation.

The current study was a correlational study and it was purported to examine the influence of four predictor variables (three exogenous variables and one moderating variable), namely KM, MI, DCs, and PED, on Malaysian E&E manufacturing firms' SCA. In other words, the study sought to examine the association among these variables posed by research questions and hypotheses using statistical procedures. However, no examination on the cause-and-effect relationships among the variables was undertaken, as the pre-determined research issues did not require the identification of cause-and-effect relationships amongst the variables of interest (Zikmund et al., 2010).

This study was a survey-based research, where a sample of respondents was asked to complete a carefully constructed standardised questionnaire. Survey research offers a quantitative or numeric description of a population by studying a sample of that population (Creswell, 2014). Survey research was employed in this study because it is an appropriate choice particularly when social scientists need to collect original data for describing a population which is too large to observe directly (Babbie, 2014). As such,

survey research requires direct participation by research respondents; hence, probability sampling was used in this study to provide a group of respondents whose characteristics reflect those of the population.

This study adopted the cross-sectional design, with the data collected at one point in time (Creswell, 2014; Zikmund, Babin, Carr, & Griffin, 2010). This study was undertaken in which data are collected just once in order to answer the research questions (Sekaran & Bougie, 2013). Despite the advantages the longitudinal data could offer, the cross-sectional design was chosen for this study because considering the time constraint for academic research. Moreover, data collection at one point in time was satisfactory to find the answer to the research questions identified earlier in this study (Sekaran & Bougie, 2013).

Lastly, the web-based survey was chosen as the means to collect the data from the sample because it allows the researcher to reach more extensive geographic areas with a relatively low cost (Cooper & Schindler, 2014). By employing the web-based survey, the respondents can access the web-based questionnaire at anytime and anywhere as long as their devices are connected to the Internet. Nevertheless, the primary drawback of the email survey is the problem of non-response. Besides, the invitation email might be treated as junk mail by the email system and could not reach the recipient's mailbox. In order to improve the response rate, a cover letter was attached to indicate the purpose of the research, the importance of the research and lastly the reason why the respondents have been selected for this study (Bryman & Bell, 2011). This may encourage respondents to participate in this survey.

3.5 Population and Sampling

In general, population is "the group of units about which we want to make judgments" (Mooi & Sarstedt, 2011, p. 37). Particularly, population is defined as "the entire group of people, events or things of interest that a researcher wishes to investigate" (Sekaran & Bougie, 2013, p. 240). Whereas a sample is a subset of the population (Sekaran & Bougie, 2013; Zikmund, Babin, Carr, & Griffin, 2010) and a sample investigates a portion of the target population, and it must be carefully determined in order to represent that population (Cooper & Schindler, 2014).

Occasionally, it may be possible to collect and analyse data from the entire population as it is of a manageable size and this is termed a census (Saunders, Lewis, & Thornhill, 2012). However, it is impossible either to collect or to analyse all the potential data available due to the restrictions of time, money and often access (Saunders et al., 2012). Hence, sampling comes into play and a sample may on occasion be more accurate than a census. Sampling can decrease interviewer mistakes, tabulation errors, and other non-sampling errors during a census along with the increased volume of work (Zikmund et al., 2010).

Sampling is defined in terms of "the population being studied" (Zikmund et al., 2010, p. 387) and the most critical aspect of sampling is that the element in the population is included in the sample is truly representative of the population (Mooi & Sarstedt, 2011). In other words, the principle of sampling is that the researcher should be able to come up with the conclusions that can be generalised to the population of interest by studying the sample (Sekaran & Bougie, 2013). Therefore, to achieve appropriate generalisability and representativeness of the sample, this study followed a careful sampling process.

This process comprised several important steps, which included (i) clear articulation the unit of analysis, (ii) specification of a practical sampling frame, (iii) determination of the sample size needed for the corresponding generalisability and statistical power, and (iv) the selection of the appropriate sampling method.

3.5.1 The target population

In particular, the target population in this study is Malaysian E&E manufacturers. The Malaysian E&E industries were further broken down into four small sub-sectors, namely consumer electronics, electronic components, industrial electronics and electrical. The table below indicates the sub-sectors of E&E industry in Malaysia.

Table 3.1
Structure of the E&E Industry

Sectors	Sub-sectors	Products
Electronic	Components	Semiconductors, passive components, printed circuit boards, metal stamped parts and precision plastic parts
	Consumer	Audio visual products such as television receivers, portable multimedia players (PMP), speakers, cameras and electronic games
	Industrial	Multimedia and information technology products such as computers and computer peripherals, telecommunications equipment and office equipment.
Electrical	Electrical	Boards, panels and consoles, switching apparatus, lamps, air conditioners, vacuum cleaners, ovens, transformers, cables & wires, primary cells & batteries, solar cells and modules

Source: Malaysian Investment Development Authority (MIDA), 2014

3.5.2 The Sampling Frame

The sampling frame is a representation of all the elements in the population from which the sample is drawn (Sekaran & Bougie, 2013). The sampling frame in this study was compiled from the online directory published by Malaysia External Trade Development Corporation (MATRADE) (MATRADE, 2017) and Federation of Malaysian Manufacturers (FMM) Directory 2016 ((FMM, 2016). These directories were chosen as a sampling frame because it provides a comprehensive list of E&E manufacturing organisations in Malaysia, which is widely adapted to by researchers who recently conducted their study pertaining to Malaysian E&E manufacturing industry (e.g., Abdullah, Jamaludin, & Talib, 2013; Oon, 2014). A total of 823 firms were identified, 566 from MATRADE and 257 from FMM. After screening for and removing of overlapping entry, the final list consists of 640 firms.

3.5.3 Determination of Sampling Method

There are two sampling techniques, namely probability sampling and non-probability sampling (Sekaran & Bougie, 2013). As opposed to non-probability sampling techniques, this study employed the probability sampling technique. Probability sampling techniques are the most commonly used because the selection of participants is determined by chance (Salkind, 2018). This is because probability sampling confirms that each element in the population is provided with a chance (not equal to zero) being included in the sample (Cooper & Schindler, 2014).

In particular, the simple random sampling procedure was employed for the current study. This sampling procedure was used based on two fundamental reasons. Firstly, this study did not require a sampling technique that segregated among the sample in terms of the

geopolitical states or other certain specific criteria. Secondly, the use of simple random sampling in this study was because the sampling lists for target population are available.

In sum, simple random sampling was employed for the current study because random sampling method ensures Malaysia E&E manufacturing firms that have been listed FMM directory and MATRADE online directory would have an equal chance to be selected as respondents in this study (Cooper & Schindler, 2014). Being a probability sampling technique, the determination of respondents to be chosen as the sample is randomly determined, and thus the chance that the sample will genuinely represent the population is increased (Salkind, 2018).

3.5.4 Determination of Sample Size

After determining the sampling frame, the sample size had to be determined. Sample size is critical in this study since this study used inferential statistics to analyse results and generalised the findings to the population. In general, larger the number in the sample will yield a higher likelihood of a representative distribution of the population. However, the gains in precision are minimal if the sample size of the study is beyond 100–250 observations (Mooi & Sarstedt, 2011). In order to have the best estimation on the size of the sample, the number of valid respondents required in this study had followed two sample size determination criteria, namely Krejcie and Morgan (1970) and a priori G*Power analysis in order to minimise the sampling error.

Krejcie and Morgan's sampling table "greatly simplified the size decision by providing a table that ensures a good decision model" (Sekaran & Bougie, 2013, p. 267). The sample size determination of Krejcie and Morgan's sampling table is a derivative from

the sample size calculation which expressed as below equation (Krejcie and Morgan, 1970). To note, the Krejcie and Morgan's sample size calculation was based on p = 0.05 where the probability of committing Type I error is less than 5 per cent (p <0.05).

$$s=X^2 NP(1-P) \div d^2 (N-1)+X^2 P(1-P)$$

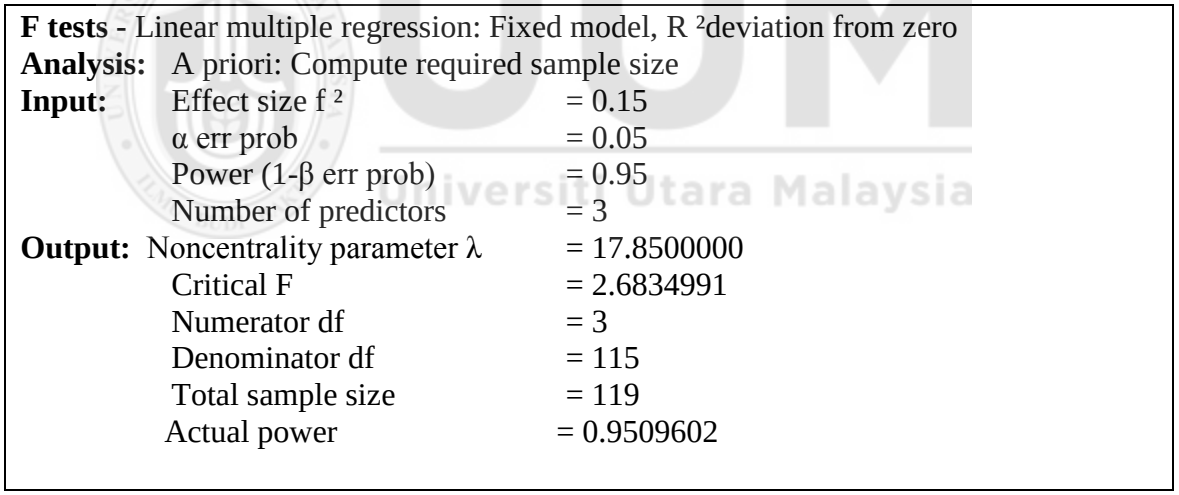
where
s = required sample size.
X^2= the table value of chi-square for 1 degree of freedom at the desired confidence level (0.05 = 3.841).
N=the population size.
P= the population proportion (assumed to be 0.50 since this would provide the maximum sample size).
d = the degree of accuracy expressed as proportion (0.05).

On the other hand, Cohen (1988) advocated to considering the power of a statistical test when selecting a representative sample for a study. The power of a statistical test is "the probability that its null hypothesis (H_0) will be rejected given that it is in fact false" (Faul, Erdfelder, Lang, & Buchner, 2007, p. 175). For this study, the G*Power 3.1.9.2 for Window program was used to calculate the sample size and it is available from free download (Faul, Erdfelder, Lang, & Buchner, 2014). Particularly, G*Power analysis is necessary for data analysis using structural equation modelling (SEM) (Hair, Hult, Ringle, & Sarstedt, 2014).

Practically, Krejcie and Morgan's (1970) sampling table was first used to determine the appropriate sample size based on the number of the population. In this study, the population size was 597. According to Krejcie and Morgan's sampling table, a sample size of 234 was required (with the number of population size rounded to 600). However, it is important to consider whether the sample size determined by Krejcie and Morgan's (1970) sampling table is sufficient to render a satisfactory level of statistical power.

Therefore, the next section aims to illustrate the estimation of sampling size using Cohen's (1988) power of a statistical test.

Following that, the minimum sample size was computed using a priori G*Power analysis. An a priori G*Power analysis of sample size was calculated based on the (i) required power level, (ii) the prespecified significance level, and (iii) the population effect size to be detected with probability (Faul, Erdfelder, Lang, & Buchner, 2007). For the current study with three main predictors (KM, MI and DCs), the power analysis revealed that a sample size of 119 was required by having the effect size of 0.15 (medium size effect), with a significance level of 0.05 and a probability to reject the null hypothesis (H_0) at 0.95. The result is demonstrated in Figure 3.2.



F tests - Linear multiple regression: Fixed model, R ²deviation from zero
Analysis: A priori: Compute required sample size
Input: Effect size f ² = 0.15
α err prob = 0.05
Power (1-β err prob) = 0.95
Number of predictors = 3
Output: Noncentrality parameter λ = 17.8500000
Critical F = 2.6834991
Numerator df = 3
Denominator df = 115
Total sample size = 119
Actual power = 0.9509602

Figure 3.2
*G*Power Analysis for Medium Effect Size*

Lastly, the computed sample size in G*Power analysis was used to cross-check if the sample size estimated from the Krejcie and Morgan's table was sufficient to render a satisfactory level of statistical power. The sample size computed by a priori power analysis (n=119) confirmed the sample size calculated from Krejcie and Morgan's table (n=234) as sufficient, as the Krejcie and Morgan's (1970) sampling table is higher than the G*Power estimation. Given that the majority response rate of the previous studies which conducted in Malaysia E&E were not satisfactory, this current study had taken a cautionary step to increase the estimated minimal sample size to account for nonresponses in survey studies (e.g., Oon, 2014). Therefore, the current study chose to double the estimated sample size, and thus about 500 respondents were randomly selected to be administered the questionnaires.

3.5.5 Determination of Unit of Analysis

The unit of analysis is "the level at which a variable is surveyed" (Mooi & Sarstedt, 2011, p. 31). The unit of analysis for an empirical study "indicates what or who should provide the data and at what level of aggregation" (Zikmund, Babin, Carr, & Griffin, 2010, p. 119). Typically, a unit of analysis in social science research would include individuals, groups and organisation. As this survey measured the managerial perceptions at firm-level, the respondents of interest should be someone who is familiar with the business of the manufacturing firm — the managers in E&E manufacturing firms in Malaysia. Given the prominent role of these managers, they were qualified as key informants to comment on organisation-wide phenomena and the implicit processes underlying the firm's internal resource and capabilities. Therefore, in the current study, managers' points of view were indeed the most representative of the firm.

3.6 Operational Definition

Survey research is flexible in the sense that it allows the research to ask many questions on a given topic, which in turns giving the researcher considerable flexibility in the analyses (Babbie, 2014). After extensively reviewing the literature on SCA, KM, MI, DCs, and PED, these variables are conceptualised and/or operationalised according to the purpose and context of this study which is presented as follows:

Table 3.2
Operational Definition

Variables	Operational Definition
SCA	SCA is operationalised in three domains, namely as the economic, environmental and social performance.
KM	KM is operationalised as firm's ability to acquire knowledge, create knowledge creation, utilise knowledge, store knowledge, and share knowledge.
MI	MI is operationalised as the firm's ability to incorporate of new management practices, processes, or structures.
DCs	DCs is operationalised as sensing capability, seizing capability and reconfiguration capability.
PED	PED is operationalised as the change in organisational environment.

3.7 Survey Instrumentation

Survey requires serious effort and thought in order to provide accurate, reliable, and valid data (Neuman, 2014). Therefore, developing a list of questions and designing the format of the questionnaire is an essential aspect of the development of a survey research design (Zikmund, Babin, Carr, & Griffin, 2010).

In this study, the variables to be measured are SCA, KM, MI, DCs, and PED. When adequate measures were available, the measures used in this study were adapted from the established measure instruments (Schilke, 2014). To note, all constructs in this study were measured using multiple indicators, all of which were measured using the standard five-point Likert scale. As opposed to a single indicator, multiple indicators permit researchers to sample from a wider range of content for a conceptual definition (Neuman, 2014). Statistically, multi-item indicators are also better than single item indicator in terms of the ability of the instruments to make accurate predictions (Diamantopoulos, Sarstedt, Fuchs, Wilczynski, & Kaiser, 2012).

Five-point Likert scales that reflect degree of attitudinal favourableness were used to measure the variables. The Likert scale is "a type of composite measure developed by Rensis Likert in an attempt to improve the levels of measurement in social research through the use of standardised response categories in survey questionnaires" (Babbie, 2014, p. 186). The Likert scale is one of the most widely used scales for measuring opinion, preference, and attitude (Leung, 2011). Generally, five-point Likert scales have five response categories, ranging from 1 (representing a negative assessment) to 5 (representing a positive assessment) (Malhotra, Nunan, & Birks, 2017). Lastly, the

response categories used in this study were strongly disagree, disagree, neutral, agree, and strongly agree (Mooi & Sarstedt, 2011).

In this study, the five-point Likert scale was chosen on the basis of the data quality. From the respondent perspective, the five-point Likert scale was adopted to reduce the frustration level of the respondents, which in turn improves the quality of the responses (Babakus & Mangold, 1992). Statistically, five-point Likert scale is able to yield data of high quality (Revilla, Saris, & Krosnick, 2014). In a study comparing five-point, seven-point and eleven-point Likert scale, Revilla, Saris, and Krosnick (2014) found that the quality of data decreases as the number of categories increases. Furthermore, the five-point scale had been broadly used in strategic management studies. Given all, all the variables in this study were measured using the standard five-point Likert scale.

In addition, reverse-worded items are recommended as a means of preventing the response biases associated with multi-item scales that are worded in a single direction (Wong, Rindfleisch, & Burroughs, 2003). However, there was no evidence that reverse-worded items prevented response bias in the latest study carried out by van Sonderen, Sanderman, and Coyne (2013). Instead, van Sonderen, Sanderman, and Coyne (2013) stated the data in their study suggested the data were contaminated by respondent inattention and confusion. As such, this study used positively-worded items considering the drawback of the use of reverse-worded items.

3.7.1 Measurement of Sustainable Competitive Advantage

In the current study, SCA was operationalised as multidimensional construct which is made up of three first-order dimensions, namely economic, environmental, and social performance. The measures of economic performance comprise of four items were adapted from Lee and Choi (2003) which is validated by Andreeva and Kianto, (2012). While the measures of environmental performance and social performance comprise of four and five items respectively were adapted mainly based on the scales reported by Paillé, Chen, Boiral, and Jin (2014) and Zhang, Di Fan, and Zhu (2014) respectively.

3.7.2 Measurement of Knowledge Management

In the previous chapter, KM is conceptualised as a processes-based approach which involves different activities. KM was operationalised as multidimensional construct which is made up of five first-order dimensions, namely knowledge acquisition, knowledge creation, knowledge utilisation, knowledge storage, and knowledge sharing. A total of 19 items that measure knowledge management processes were adapted from Tan and Wong (2015).

3.7.3 Measurement of Management Innovation

To avoid confusions associated with differing interpretations of MI, MI was measured based on what was established in the Oslo Manual (OECD, 2005). As opposed to measuring a particular example of MI, this study chose to focus on firm's ability to incorporate of new management practices, processes, or structures which bring fundamental changes in the management of the organisation. The measures of MI comprise of 4 items were adapted from Nieves and Segarra-Ciprés (2015).

3.7.4 Measurement of Dynamic Capabilities

In the previous chapter, DCs are conceptualised as processes relating to sensing and seizing opportunities and reconfiguring the organisational resource base (Teece, Pisano, Shuen, & Winter, 1997). The measure DCs were adapted from Kuo, Lin, and Lu (2017). DCs were operationalised as multidimensional construct that comprising 16 items which made up of three first-order dimensions, namely sensing capability, seizing capability and reconfiguration capability.

3.7.5 Measurement of Perceived Environmental Dynamism

Instead of using archival data, the current study measured environmental dynamism using perceptual data. To measure managerial perception of the organisational environment, the measurement scales of PED were mainly adapted from Schilke (2014), which originally developed by Miller and Friesen (1982) and Jap (1999). The measurement scales comprised of four items which captured the respondent's perception of environmental dynamism which comprises four aspects, namely product life cycle, technology, competition, and customers.

Table 3.3
Summary of Measures

Variable	No. of Items	Source
SCA		
Economic Performance	*5*	Adapted from Lee and Choi (2003); Andreeva and Kianto, (2012); Paillé, Chen, Boiral, and Jin (2014); Zhang, Di Fan, and Zhu (2014)
Environmental Performance	*4*	
Social Performance	*5*	
KM		
Knowledge Acquisition	4	Adapted from Tan and Wong (2015)
Knowledge Creation	3	
Knowledge Utilisation	4	
Knowledge Storage	4	
Knowledge Sharing	4	
MI	4	Adapted from Nieves and Segarra-Ciprés (2015)
DCs		
Sensing Capability	5	Adapted from Kuo, Lin, and Lu (2017)
Seizing Capability	5	
Reconfiguration Capability	6	
PED	4	Adapted from Schilke (2014)

3.8 Questionnaire

The questionnaire was organised into four parts (See Appendix A for details). The section soliciting demographic information of the participating manufacturing firm was placed at the foremost Part A, as these questions did not require hard mental ability and were easy to answer. Following that, Part B and C comprise measures of variables of interest. Lastly, Part D solicited information regarding respondents' background. These four parts are per detailed separately as follow.

Part A requested respondents to respond to eight inquiries which solicited firm profile. The firm profile solicited details such as E&E sub-sectors (i.e., consumer electronics, electronic components, industrial electronics, and electrical), state, year of establishment, type of business legal structure, type of ownership structure, market orientation, annual sales turnover and number of full-time employees. Part B included fifteen questions, requesting respondents to rate their perception on the statements pertinent to SCA. These questions reflected three dimensions of SCA, namely economic performance (five items), environmental performance (four items) and social performance (five items).

Subsequently, Part C contained questions directed at the determinants of firm's ability to achieve SCA, namely KM (19 items), MI (four items), DCs (16 items), and environmental dynamism (four items). Part D, the final part of the questionnaire requested personal details about the respondent, namely position, gender, working duration, and education background. Lastly, the respondents are also given the opportunity to provide feedback or comments.

3.9 Validity and Reliability

Validity and reliability are two important concerns that ensure upon the goodness of data (Sekaran & Bougie, 2013). This is because the effect of measurement error and poor reliability cannot be directly perceived because they are rooted in the observed variables (Hair, Black, Babin, & Anderson, 2010). Hence, the quality of research findings can be enriched by addressing the validity and reliability of a measure, although it might take effort, time, and extra resources to reinforce the proven results.

It is important for the researchers to make sure that the instruments that have been developed serve their purposes and researchers have not disregarded some critical dimensions and elements or incorporated some irrelevant one (Sekaran & Bougie, 2013). According to Hair et al. (2010), the validity of a measure refers to the degree to which a measure precisely depicts what it is presumed to measure. Therefore, content validity (i.e., pretest) was carried out to make sure the measure reflects the content of the concept being studied.

Reliability of a measure refers to the consistency of the measure (Hair et al., 2010). Reliability tests can be further broken down to stability-over time, representative-across subgroups and equivalence-across indicators (Neuman, 2014). This study follows Neuman's (2014) suggestions to improve the reliability in four ways which are conceptualising the constructs clearly, employing a clear-cut level of measurement, employing multiple indicators, and carrying out the pilot test. Cronbach's alpha internal consistency reliability test was performed to test the internal reliability (Gliem & Gliem, 2003). As 30 samples are the minimum acceptable sample size to perform the analysis, this study conducted a pilot test to examine validity and reliability of the items in the

questionnaire using the SPSS software package before further on the full study (Sekaran & Bougie, 2013). Pretest and pilot test are per detailed separately as follow.

3.9.1 Pretest

Content validity refers to the degree that a measure covers the domain of interest (Zikmund, Babin, Carr, & Griffin, 2010). In this study, the content validity assessment is part of the pretest to content-validate the survey instruments and three faculty members from the School of Business Management, Universiti Utara Malaysia were requested to review the design of the questionnaire which included the layout, wording, sequencing as well as languages used.

The panel members were selected based on their expertise and knowledge in the business management field and each of the panel experts was given a copy of a survey-like document as per the structured questionnaire. The experts were then given time to validate the survey instrument and they were requested to contact the researcher for getting back the questionnaires upon completion. The outcome of the content-validate process resulted in some minor amendment in the questionnaire.

After making the amendments accordingly, face validity was conducted by having discussions with selected managers and executives from the E&E manufacturing firms. This is to ensure that they can understand the questions in the questionnaire well. They are welcome to point out those difficult worded items which they did not understand or take some times to for them comprehend (Bryman & Bell, 2011). Practically, three experts in this field were approached in order to obtain useful comments about the content of the questionnaire to ensure that the items are valid (Sekaran & Bougie, 2013).

This step helped to detect ambiguous questions and technical jargon that might jeopardise the understanding of the respondents and their comments were used to make some amendments for the pilot study.

3.9.2 Pilot Study

A pilot study is "small-scale research project that collects data from respondents similar to those that will be used in the full study" (Zikmund et al., 2010, p. 65). Hence, pilot study is crucial, especially in research which is based on a self-completion questionnaire. In other words, the data-gathering process of a business research typically commences with pilot study (Cooper & Schindler, 2014). By doing so, pilot study can make sure that the research instrument is functioning well as a whole (Bryman & Bell, 2011).

To the extent possible, a pilot test should administer the questionnaire in the environment and context that similar to the actual study (Malhotra, Nunan, & Birks, 2017). Therefore, this study was drawing the respondents from the target population and simulate the procedures and protocols that have been designated for data collection (Cooper & Schindler, 2014). For the pilot test, the Cronbach's alpha internal consistency reliability tests were undertaken in this study. The minimal reliability coefficient of .70 is required to claim a construct as consistently reliable (Nunnally, 1978).

Towards this end, pilot testing was carried out on a selection of 100 respondents from the sampling frame. To note, the respondents selected for the pilot testing were not included in the final sample to ensure that the study did not use the same respondents. This concern was to avoid the duplicate response to the dataset which in turn lower the overall quality of the survey (Ruel, Wagner, & Gillespie, 2016). The results of internal

consistency reliability are depicted in Table 3.4 and the internal consistency of the measurement was determined based on the 30 questionnaires obtained from the pilot study. The Cronbach's Alpha values for all the variables in this study were more than 0.7, indicating very good and excellent reliability (Nunnally, 1978). Hence, all the items have been retained for field study.

Table 3.4
Reliability Results of all Variables

Variables	Cronbach's Alpha (α)
Knowledge Acquisition	0.710
Knowledge Creation	0.755
Knowledge Utilisation	0.815
Knowledge Storage	0.876
Knowldege Sharing	0.765
MI	0.740
Sensing Capabilities	0.802
Seizing Capabilities	0.806
Reconfiguring Capabilities	0.816
PED	0.726
Economic Performance	0.817
Environmental Performance	0.729
Social Performance	0.915

3.10 Data Collection

Accuracy in data collection is the keystone upon which all subsequent data processing and data analysis depend on (McNabb, 2014). In a quantitative setting study, it is crucial to make sure the data collected is representative of the targeted population since the findings will be generalised to the population at large (Creswell, 2014). Hence, data collection must be handled with care.

Generally, there are several available tools and ways through which researchers collect data. Particular in line with the quantitative approach adopted in the current study, the current study chose to collect data using questionnaire. While questionnaires administration could be administered by telephone, mail, and web-based questionnaire (Dillman, Smyth, & Christian, 2014), the current study opted for a web-based questionnaire. Therefore, selected respondents were required to answer the questions in the form of web-based questionnaires.

E-mail was used to contact and direct the short-listed respondents to the web-based questionnaires. Apart from this, a personalised cover letter was attached as well in the email-invitation letter to elucidate the purpose of the research, the importance of the research and reasons why the respondents had been selected to participate in this study. Apart from this, a reminder was sent to those respondents who have not responded two weeks after the first email. Besides, a follow-up phone call was made to those respondents who had not responded two weeks after the reminders in order to improve the response rate.

3.11 Techniques of Data Analysis

This study used multivariate data analysis techniques to analyse the variables in this study simultaneously through the application of statistical methods (Hair et al., 2014). In particular, SEM using partial least square (PLS) was used in order to test the theoretical model and make inferences based on the analysed results from the data collection (Wold, 1974). SEM is the approach to analysing path models with latent variables and the phrase partial least square structural equation modelling (PLS-SEM) is used in this study to refer to SEM using PLS. The Smart PLS 3 software developed Ringle, Wende, and Becker (2015) by was used to analyse the data.

In brief, PLS-SEM allows researchers to assess inter-related dependence relationships simultaneously. The application of PLS-SEM in empirically testing the theories and conceptual models is common in the strategic management discipline research (Hair, Pieper, & Ringle, 2012). The fitness of PLS-SEM in this study was based on the following considerations. Firstly, PLS-SEM is applicable because this study focuses on prediction and explaining the variance of SCA by different explanatory constructs at the same time (Hair et al., 2012). Secondly, PLS-SEM has been recommended as prediction oriented for an extension of an existing theory (Henseler, Ringle, & Sinkovics, 2009). This study extends the constructs used in the study, for instance, two dimensions have been added to the measurement of SCA and PLS-SEM was employed due to extending some of the construct used. Thus, the use of PLS-SEM seems warranted in this study set-up.

PLS-SEM estimates "the parameters of a set of equations in a structural equation model by combining principal components analysis with regression-based path analysis"

(Sarstedt, Ringle, & Hair, 2017, p. 2). The data analysis procedure using Smart PLS in this study had undergone the following steps. First, the data collected was screened using SPSS first to ensure its suitability for the PLS analysis by addressing the missing data, suspicious response patterns, outliers and data distribution (Hair et al., 2014). After the data screening, path-modelling estimation was carried out to get the initial results (Hair et al., 2014). In particular, there are two stages of the evaluation of PLS-SEM results, namely the measurement model and structural model (Sarstedt et al., 2017). In the measurement model stage, reflective measurement model and formative measurement model were examined. The measurement model assessment indicated satisfactory data quality; the path models estimation continued with the assessment of the structural model that involves testing the proposed hypotheses (Sarstedt et al., 2017). Lastly, supplementary PLS-SEM analysis was carried out to assess the moderating effect of PED (Henseler & Fassott, 2010).

3.12 Summary of Chapter

This chapter presents the research framework of the study, subsequently, led to the formulation of hypotheses to elucidate the research questions. Meanwhile, the research design for this study is discussed as well. Besides, this chapter also provides a detailed explanation on the target population, sample frame, the sampling method used, and sample size required by the statistical power needed. Apart from this, the research methodology employed to carry out this study has also been discussed by highlighting operational definitions, questionnaire design, validity and reliability tests and data collection procedures. Finally, data analysis tools and techniques are described. The data analysis and findings will be further discussed in the next chapter.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter reports the findings and interpretations of main analysis results from this study. Response rate and non-response bias test results are reported in Section 4.2. The subsequent sections present the data screening in which the raw data are checked before the main analysis is conducted and follows with the descriptive statistics of the usable responses. For ease of discussion, the findings of the three main analyses, namely the assessment of measurement models, structural model and hypothesis testing are organised in separate sub-sections, followed by summary of the chapter.

4.2 Survey Response Rate and Response Bias Test

Of the 500 questionnaires distributed, 192 sets questionnaires were returned with a response rate of 38.4 per cent. Seven questionnaires were discarded because of missing data and inappropriate responses (i.e., straight-lining). This left with 185 usable datasets for analysis, yielding a usable response rate of 37 per cent. The response rate is summarised in Table 4.1.

Table 4.1
Summary of the Responses for the Survey

	Number of Questionnaires
Total questionnaires administered	500
Returned questionnaires	192
Usable questionnaires	185

4.2.1 Test of Non-response Bias

Low response could have significant effects on the sample representativeness and the generalisability of the collected data to the whole population because of the existence of nonresponse bias (Mellahi & Harris, 2016; Rogelberg & Stanton, 2007). Nonresponse bias occurs when respondents who respond to a survey are distinct from those who did not respond (Dillman, Smyth, & Christian, 2014; Sax, Gilmartin, & Bryant, 2003). As such, nonresponse bias test was carried out with the entire remaining 185 usable responses to examine whether if the current study's results exhibit bias and, thereby, to reduce the concerns about the external validity.

The current study employed the nonresponse bias impact assessment strategy (N-BIAS) as proposed by Rogelberg and Stanton (2007) to examine nonresponse bias. A wave analysis was carried out to assess the difference between early responses and late responses. Wave analysis was adopted to check the nonresponse bias test in the current study because non-respondent data are not available (Werner, Praxedes, & Kim, 2007). This test takes into account the differences in the timing of returned surveys (Halbesleben & Whitman, 2013).

To conduct wave analysis, the data sets were separated into two groups, namely the early and late respondents. The returned data sets after the first email invitation were

considered as early responses while the returned data sets after the follow-up email reminders were considered as late responses. The current study used late responses as a surrogate for non-response. The independent sample t-test was conducted on all study variables to compare the difference between the early and late responses. Table 4.2 shows all p-value are above the required cut-off value of 0.05. Hence, no variable indicates significant differences for early and late responses. The results suggest non-response bias was not a concern for the current study.

Table 4.2
Results of Nonresponse Bias for Variables

Variable	Mean for early respondents	Mean for late respondents	Difference in means (Early vs. Late)	p-value (two-tail)
KM	3.8106	3.7755	0.03514	0.618
DC	3.8714	3.9369	-0.6545	0.276
MI	3.6580	3.6276	0.03049	0.761
PED	3.7299	3.8163	-0.8644	0.287
SCA	3.9261	3.8586	0.6751	0.171

4.3 Data Screening

After the non-response bias test, the datasets were subjected to further screening through three steps data cleaning procedures, namely missing data analysis, outlier detection, and examination of normality.

4.3.1 Missing Data Analysis

Missing data occurs when respondents do not provide answers to certain questions (Mooi & Sarstedt, 2011). Missing data analysis aims at identifying the existence of pattern in missing data that would affect the analysis. For this purpose, the frequency distribution of the data was used to check missing data. Descriptive statistics such as minimum and maximum values of the variables, mean, and standard deviation were examined to detect any missing values or errors in the datasets. Table 4.3 below shows that there were no missing values in the data collected and the minimum and maximum values also are within the range of 1 to 5. Hence, the datasets are free from missing data issue.

Table 4.3
Missing Value Test

Variables	N	Minimum	Maximum	Mean	Standard Deviation	Missing Data
KM	185	2.11	5.0	3.7920	0.47718	0
DC	185	2.44	4.88	3.9061	0.40683	0
MI	185	1.75	5.00	3.6419	0.67702	0
PED	185	2.25	5.00	3.7757	0.55015	0
SCA	185	2.93	4.86	3.8903	0.33412	0

4.3.2 Outlier Detection

Having dealt with the missing data, the dataset was subjected to outlier detection before the assessment of normality assumption was examined. Outliers are "values that are uniquely different from all the other observations and influence results substantially" (Mooi & Sarstedt, 2011, p. 88). Outlier issues are concern and crucial issue to researcher because the existence of outliers usually exerts a disproportionate impact on the substantive conclusion regarding relationships among variables (Aguinis, Gottfredson, & Joo, 2013).

The detection of outliers can be performed in three different forms: univariate, bivariate and multivariate detection (Hair et al., 2010; Tabachnick & Fidell, 2013). Univariate detection examine extreme values within each single variable (Tabachnick & Fidell, 2013). Bivariate detection is an addition to univariate detection and pairs of variables can be performed through a scatterplot (Hair et al., 2010). Lastly, multivariate techniques evaluate the distance between an observation and a centroid of data points computed from two or more variables (Tabachnick & Fidell, 2013).

Univariate outliers were examined in the current study by standardising all raw scores in the distribution to obtain Z-score for each individual variable (Hair et al., 2010; Tabachnick & Fidell, 2013). As suggested by Hair et al. (2010), cases typically are considered as outliers with the standard scores of 2.5 or greater for the small sample ($n \leq 80$), whilst the threshold value of standard scores for larger sample size ($n > 80$) is up to 4. Given that the sample size (n=185) was considerably large, the threshold value of standard score of ± 4 was used to detect outliers. Table 4.4 below shows the result of descriptive statistics on maximum and minimum values of standardised score for each

variable. Based on the result of analysis from standard value of Z-score, no case has indicated value exceeding the threshold value of ±4.

Table 4.4
Standardised Scores for Each Variable

Variables	N	Minimum	Case < -4	Maximum	Case > 4
KM	185	-3.53490	Nil	2.53149	Nil
DC	185	-3.60981	Nil	2.38163	Nil
MI	185	-2.79443	Nil	2.00601	Nil
PED	185	-2.77320	Nil	2.22543	Nil
SCA	185	-2.87854	Nil	2.89357	Nil

This study did not consider bivariate outlier detection as it became inadequate in the sense that, because this method would require a large number of graphs to be produced, and each time each inspection caters for only two dimensions (Hair et al., 2010). Instead, multivariate techniques are used to detect cases with an unusual combination of scores on two or more variables that are appropriate for use in this study. The detection of multivariate outliers in the current study was carried out by computing the Mahalanobis distance (D^2) measure for every single case using linear regression methods in SPSS (Pallant, 2016; Tabachnick & Fidell, 2013). Mahalanobis distance (D^2) is "the distance of a case from the centroid of the remaining cases where the centroid is the point created at the intersection of the means of all the variables" (Tabachnick & Fidell, 2013, p. 74).

To identify which cases are multivariate outliers, Mahalanobis distance (D^2) is evaluated as a critical chi-square value using the number of independent variables as the degrees of freedom (Pallant, 2016). As suggested by Tabachnick & Fidell (2013), the accepted criterion for multivariate outliers is Mahalanobis distance at a stringent alpha level ($p < .001$), multivariate outliers are evident if Mahalanobis distances (D^2) for any

particular case is higher than the critical value of chi-square. With the degree of freedom of 4, as well as Tabachnick & Fidell (2013) recommended alpha value of 0.001, the critical chi-square value is 18.47. Based on the results of the analysis of Mahalanobis distance, it revealed that 4 cases (samples 16, 43, 57, and 59) were exceeding the critical value, with the alpha level of 0.001 (see Appendix B). Hence, these cases were detected as multivariate outliers.

Despite the existence of outlier cases in multivariate analysis, there is neither a methodological nor a theoretical reason to remove outlier cases from analysis on the basis of their extremity. Rather, these extreme cases might represent very unusual abnormalities. As such, the current study retained all sample sets and chose to analyse the data using nonparametric statistics where appropriate (Aguinis et al., 2013).

4.3.3 Assessment of Normality Assumption

Having dealt with the outlier detection, the remaining sample was further subjected to normality assessment. Normality is the degree to which the distribution of the sample data corresponds to a normal distribution (Hair et al., 2010). In other words, the assumption of normality is based on the assertion the frequency which the observed values associated with a variable will follow a normal distribution in any sizeable population (Mertens, Pugliese, & Recker, 2017).

Skewness and kurtosis value can be used to assess normality (Pallant, 2016; Tabachnick & Fidell, 2013). Skewness is associated with the symmetry of the distribution and kurtosis is associated with the peakedness of a distribution (Tabachnick & Fidell, 2013). The statistics of the absolute skewness and kurtosis values were inspected and presented

in Table 4.5. Almost skewness values were found to be within the acceptable range of ±1 (Hair, Hult, Ringle, & Sarstedt, 2017), with only one value within the acceptable range of ±2 (Garson, 2012). For the kurtosis results, almost of the kurtosis values fell well within the range of ±1, with some within the range of ±2 and ±3; all of which were within the acceptable range (Garson, 2012).

Table 4.5
Skewness and Kurtosis

Variables	Skewness	Kurtosis
KM	-1.288	2.534
DC	-1.065	1.766
MI	-0.948	0.564
PED	-0.574	0.027
SCA	0.002	0.457

Besides, the data was also examined by plotting the Q-Q Plot to further confirm the normality of distribution. Figure 4.1 indicates the majority of the observations are located close to the trend line and it implied of no serious violation on normality of data and assumption can be made that multivariate normality has been achieved and variables in question are assumed to be approaching normal.

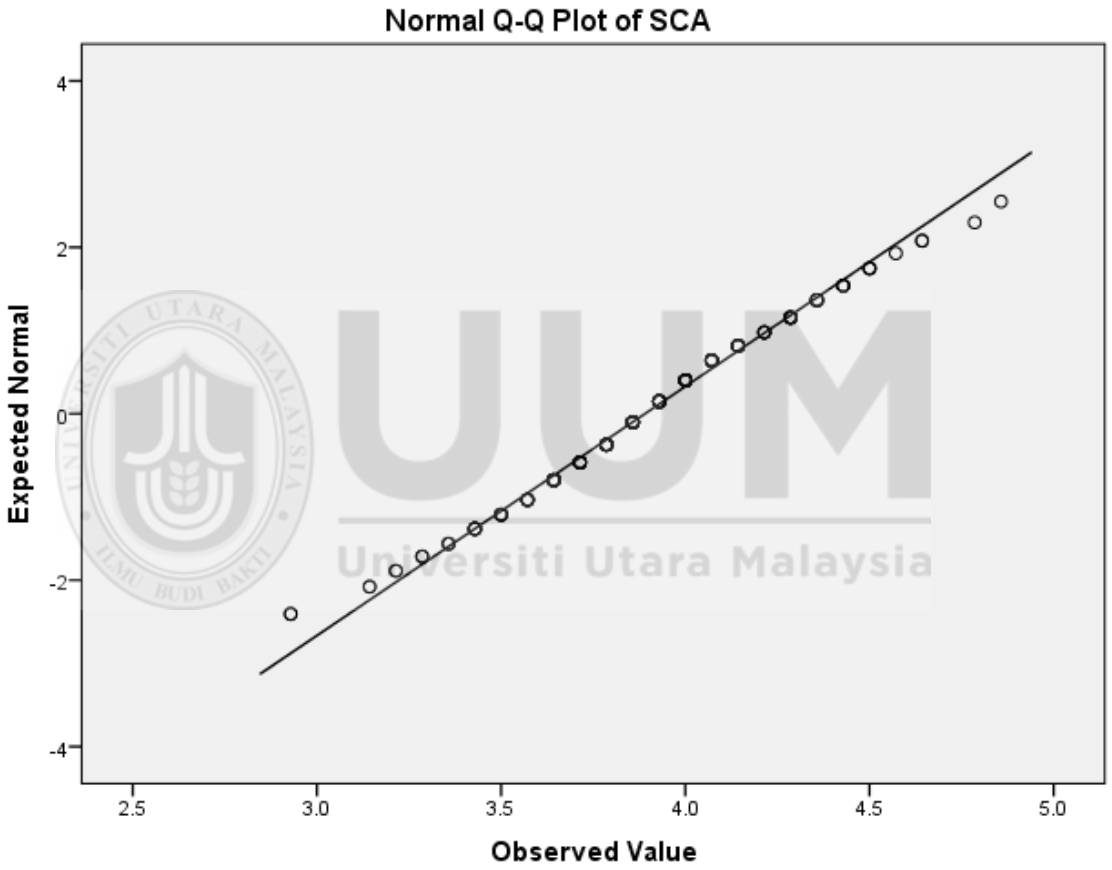


Figure 4.1
Normal Q-Q Plot

4.4 Profile of Responding E&E Manufacturing Firms

This section provides background information on the E&E manufacturing firms that had participated in the survey. Question included in this study are type of business, geographical distribution, firm age, form of ownership, legal status, market orientation, annual sales turnover, and the number of full-time employees. The results are presented and examined in the following sub-sections.

4.4.1 Types of Business

The sample was made up of respondents in a variety of E&E manufacturing firms. The highest percentage of E&E firms came from firms producing electronic components (38.3 per cent), followed by industrial electronic (30.3 per cent), electrical (18.3 per cent) and consumer electronics (14.1 per cent).

Table 4.6
Type of Business

	Frequency	Percentage
Consumer Electronics	26	14.1
Electronic Components	71	38.3
Industrial Electronics	56	30.3
Electrical	34	18.3
Total	185	100

4.4.2 Geographical Distribution of Sample

Among the responding firms, about 35.2 per cent of firms from the sample were from Selangor, followed by 26 per cent from Penang and 10.9 per cent from Johore. The rest of the sample constituents were from other states including Kedah (8.1 per cent), Negeri Sembilan (7 per cent), Perak (4.3 per cent), Federal Territory of Kuala Lumpur (3.2 per cent), Malacca (3.2 per cent), Pahang (1.6 per cent) and Sabah (0.5 per cent).

Table 4.7
Geographical Distribution

State	Frequency	Percentage
Selangor	65	35.2
Penang	48	26
Johor	20	10.9
Kedah	15	8.1
Negeri Sembilan	13	7
Perak	8	4.3
Kuala Lumpur	6	3.2
Malacca	6	3.2
Pahang	3	1.6
Sabah	1	0.5
Total	185	100

4.4.3 Firm Age

Table 4.8 illustrates slightly more than three-quarter of E&E manufacturing firms have been in the business for more than 15 years (76.7 per cent); 11.9 per cent of the firms have run their business between 11-15 years. Altogether, the results indicate that most of the E&E manufacturing firms in the sample are more than ten years old; while the remaining E&E manufacturing firms are either 5-10 years (7.6 per cent) or less than five years ago (3.8 per cent). The result implies that most of the responding E&E manufacturing firms have come of age and accumulated experience in producing their products.

Table 4.8
Firm Age

	Frequency	Percentage
Less than 5 years	7	3.8
5-10 years	14	7.6
11-15 years	22	11.9
More than 15 years	142	76.7
Total `	185	100

4.4.4 Form of Ownership

From Table 4.9, the results show that slightly less than a third of the firms are owned by Malaysian citizens (31.3 per cent), while the remaining E&E manufacturing firms that are foreign-owned (35.7 per cent), and under joint ownership between local citizens and foreigners (33 per cent).

Table 4.9
Form of Ownership

	Frequency	Percentage
Citizen-owned	58	31.3
Foreign-owned	66	35.7
Joint Foreign/ Citizen-owned	61	33.0
Total	185	100

4.4.5 Legal Status of E&E Manufacturing Firms

While private limited company constituted the majority of the sample (83.25 per cent), the remaining E&E manufacturing firms are partnership (13.5 per cent) and individual proprietorship (3.25 per cent).

Table 4.10
Legal Status of Firm

	Frequency	Percentage
Individual proprietorship	6	3.25
Partnership	25	13.5
Private limited company	154	83.25
Total	185	100

4.4.6 Market Orientation

Table 4.11 shows that slightly more than half of the sample exported their manufactured goods overseas (54.6 per cent). Nearly a third of those surveyed serve domestic and overseas market (29.2 per cent) and firms that sell their product locally (16.2 per cent). The results imply that E&E manufacturing firms in Malaysia are heavily reliant of the external market.

Table 4.11
Market orientation

	Frequency	Percentage
Domestic Oriented	30	16.2
Export Oriented	101	54.6
Both domestic and export	54	29.2
Total	185	100

4.4.7 Annual Sale Turnover

Table 4.12 shows 43.2 per cent of the firms in the sample has sales turnover of more than RM50 million. 30.3 per cent of the sample has a turnover of between RM 15 million to 15 million while 26.5 per cent of firms has a sales turnover of between RM300, 000 to RM 15 million.

Table 4.12
Annual sale turnover

	Frequency	Percentage
RM 300,000 to RM 15 million	49	26.5
RM 15 million to RM 50 million	56	30.3
More than RM 50 million	80	43.2
Total	185	100

4.4.8 Number of Full-time Employees

The results show that 61.6 per cent of the sample has more than 200 full-time employees. This is followed by 75 to 200 employees (23.8 per cent), only 14.6 per cent of the sample employed less than 75 employees. It is found that more than 80 per cent of the SMEs employed more than 75 employees.

Table 4.13
Number of Full-time Employees

	Frequency	Percentage
Less than 75 employees	27	14.6
75 to 200 employees	44	23.8
More than 200 employees	114	61.6
Total	185	100

4.5 Respondent Profile

This section presents background information of the respondents. Respondents' characteristic examined includes the current position, gender, tenure working for the firm and their educational level. The results are presented and examined in the following sub-sections.

4.5.1 Respondents' Current Position

The majority of the respondents comprise of managers of the firms (76.2 per cent), followed by managing director (13 per cent) and chief executive officer (2.2 per cent). The respondents from top management provided some assurance on the validity of responses, as they could generally be more knowledgeable about their firms' business.

Table 4.14
Respondent's Current Position

	Frequency	Percentage
Managing Director	24	13.0
Chief Executive Officer	4	2.2
Manager	141	76.2
Others	16	8.6
Total	185	100

4.5.2 Gender

Table 4.15 shows the majority of the respondents in the sample are males (78.9 per cent) and the remaining are females (21.1 per cent).

Table 4.15
Gender

	Frequency	Percentage
Male	146	78.9
Female	39	21.1
Total	185	100

4.5.3 Respondent's Tenure

Table 4.16 shows the number of years that respondents had been working with their current employer. Slightly more than half of those who responded have been working for more than ten years (54.6 per cent). Just less than one-fifth have been employed for the job for less than five years (54.6 per cent), while 26.5 per cent of the participants in the survey have been working for 5-10 years with the current employer.

Table 4.16
Respondent Tenure

Tenure	Frequency	Percentage
Less than 5 years	35	18.9
5-10 years	49	26.5
11-15 years	63	34.1
More than 15 years	38	20.5
Total	185	100

4.5.4 Level of Education

The respondents were also asked about their educational background. In terms of highest education level, more than half of the respondents have a bachelor degree (63.4 per cent). Of the remaining, 23.4 per cent were postgraduate, followed by diploma holders (6.6 per cent) and advanced diploma holders (1.6 per cent). However, about 5 per cent of the respondents have completed their education up to secondary-school level.

Table 4.17
Level of Education

Level of education	Frequency	Percentage
SPM or equivalent	2	1.2
Certificate	1	0.5
STPM or equivalent	6	3.3
Diploma	12	6.6
Advanced Diploma	3	1.6
Bachelor	117	63.4
Postgraduate	43	23.4
Total	185	100

4.6 Data Analysis with PLS-SEM

After the data screening, data analysis was conducted using a PLS-SEM software, namely Smart PLS 3 (Ringle, Wende, & Becker, 2015) for estimating the path models with latent variables and their relationships. Path models are "diagrams used to visually display the hypotheses and variable relationships that are examined when SEM is applied" (Hair et al., 2014, p. 11).

To note, the path model can be divided into two models, namely the measurement model and structural model. Figure 4.2 depicts an example of a PLS path model. The measurement model describes the relationship between a construct and its observed indicators whereas the structural model describes the relationship between the constructs (Hair et al., 2014).

On the other hand, there are two different types of measurement models, namely reflective models or formative models (Diamantopoulos & Winklhofer, 2001; Henseler, Hubona, & Ray, 2016). The reflective model (also referred to as Mode A) is based on the assumption that "all items reflect the same construct" (Sarstedt, Hair, Ringle, Thiele, & Gudergan, 2016, p. 4000) whereas the formative measurement model (also referred to as Mode B) dictates that "the indicators cause the construct" (Hair et al., 2014, p. 43).

Given their different nature, Hair et al. (2014) stated that reflectively and formatively measured construct must be evaluated separately in the measurement model since they are conceptually different from each other. This study followed recent guidelines for PLS-SEM (e.g., Hair et al., 2014) to evaluate and report the results. To begin with, the

assessment of the measurement model started with the reflective measurement model and followed by the formative measurement model.

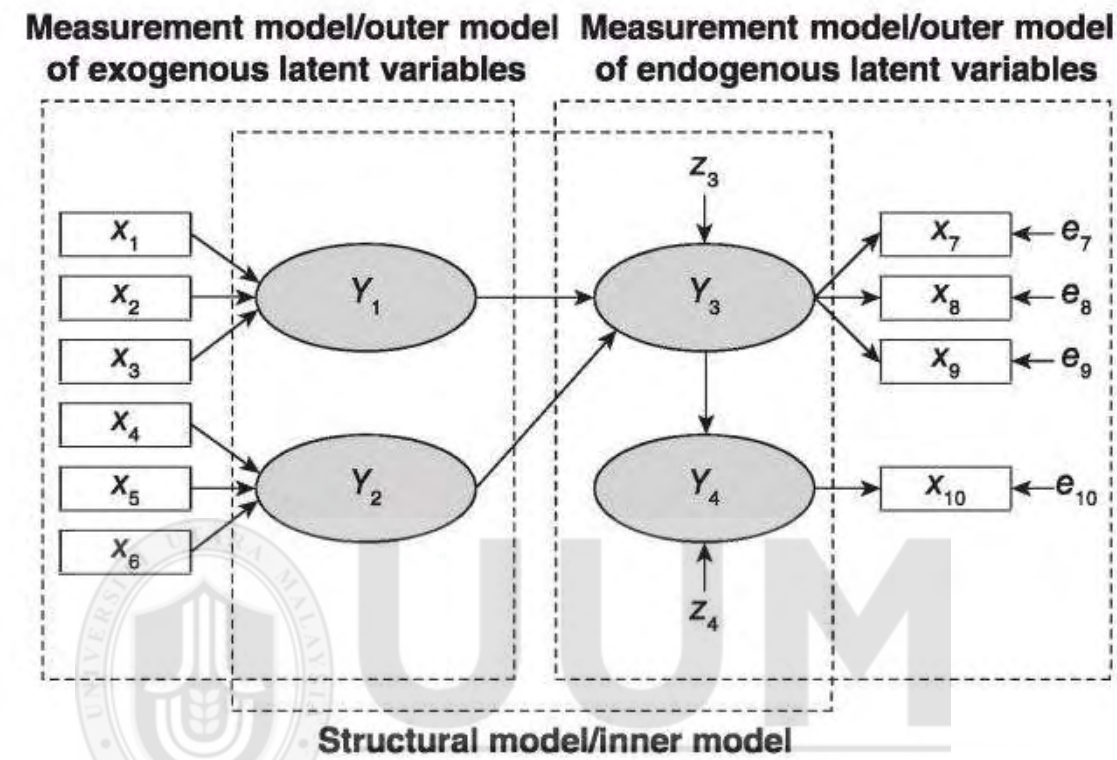


Figure 4.2
PLS Path Model
Source: Hair et al. (2014)

Besides, the current study also involved the use of hierarchical component models (HCMs) to reduce model complexity. Following Jarvis, MacKenzie and Podsakoff's (2003) criteria for measurement model operationalisation, KM, DCs, and SCA are operationalised as a second-order reflective-formative construct. Unlike the first-order models, the observed variables (or indicators) to estimate the construct scores of a second-order construct are not available (Becker, Klein, & Wetzels, 2012).

When dealing with HCMs, it is essential to differentiate between (at least) two levels of analysis; that is, the first level associated with the manifest indicators to (lower-order) dimensions, and a second level associated with the individual dimensions to the higher-order component (Jarvis, MacKenzie, & Podsakoff, 2003; MacKenzie, Podsakoff, & Jarvis, 2005). In PLS-SEM, two approaches are commonly used to estimate the parameters in HCMs, namely the two-stage approach and repeated indicator approach (Ringle, Sarstedt, & Straub, 2012; Wetzels, Odekerken-Schröder, & van Oppen, 2009).

In terms of the precision of estimates, Becker, Klein, and Wetzels (2012) prefered the repeated indicator approach over the two-stage approach. However, repeated indicator approach requires particular attention when the higher order component (i.e., SCA) is endogenous construct since almost all variance of the higher order component is explained by its lower order components (Ringle et al., 2012). Consequently, the path relationship between the exogenous constructs and the endogenous higher order component is always approximately zero and non-significant (Hair et al., 2014).

In light of this, the current study estimated the path model in a two-stage approach in order to assess the higher order components in PLS-SEM. Particularly, items were

assigned to each dimension of the first-order models and the second-order constructs were created. After performing the PLS algorithm, the latent variable scores (LVS) were saved and created a new database. Further analyses, namely the second-order formative measurement model and structural measurement model analysis were performed with the LVS of the low order components as manifest variables.

After the assessment of HCMs, the measurement model assessment validates that all the measures are valid and reliable and the data analysis proceeds with the assessment of the structural model. In assessing the structural model, this study adhered to the statistical procedure recommended by Hair et al. (2014, p.169). The procedure is composed of five main steps, as shown in Figure 4.3. However, Step 5 was not carried out due to the endogenous constructs (i.e., SCA) is formatively measured and the blindfolding procedure does not work for formative measured SCA (Hair et al., 2014).

For the structural model, the hypothesis testing only focused on the direct relationships between independent variables and the dependent variable (H_1 to H_3). Subsequently, hypothesis testing focused on the moderating effect of PED. In order to assess the moderating effects in PLS-SEM, interaction effects between the moderator and predicting variables were developed to examine their effects on the endogenous variable. The product indicator approach and the two-stage approach are always used when creating the interaction term in the PLS path model (Fassott, Henseler, & Coelho, 2016). Following the guidelines given by Hair et al. (2017), two stages approach was used to create the interaction terms because the exogenous variable and moderator are formatively measured.

In particular, this study followed the steps suggested by Hair et al. (2017) and Henseler and Fassott (2010) to examine the moderating effect. In Stage 1, the LVS of each construct were saved for the assessment of the moderating effect. This can be done by running the PLS path model without the interaction term of the moderating variable. For Stage 2, the interaction terms are built up by multiplying the LVS of the KM, MI and DCs and the moderating variable (i.e., PED) from Stage 1 to form a single-item latent variable used to estimate the moderating effect.

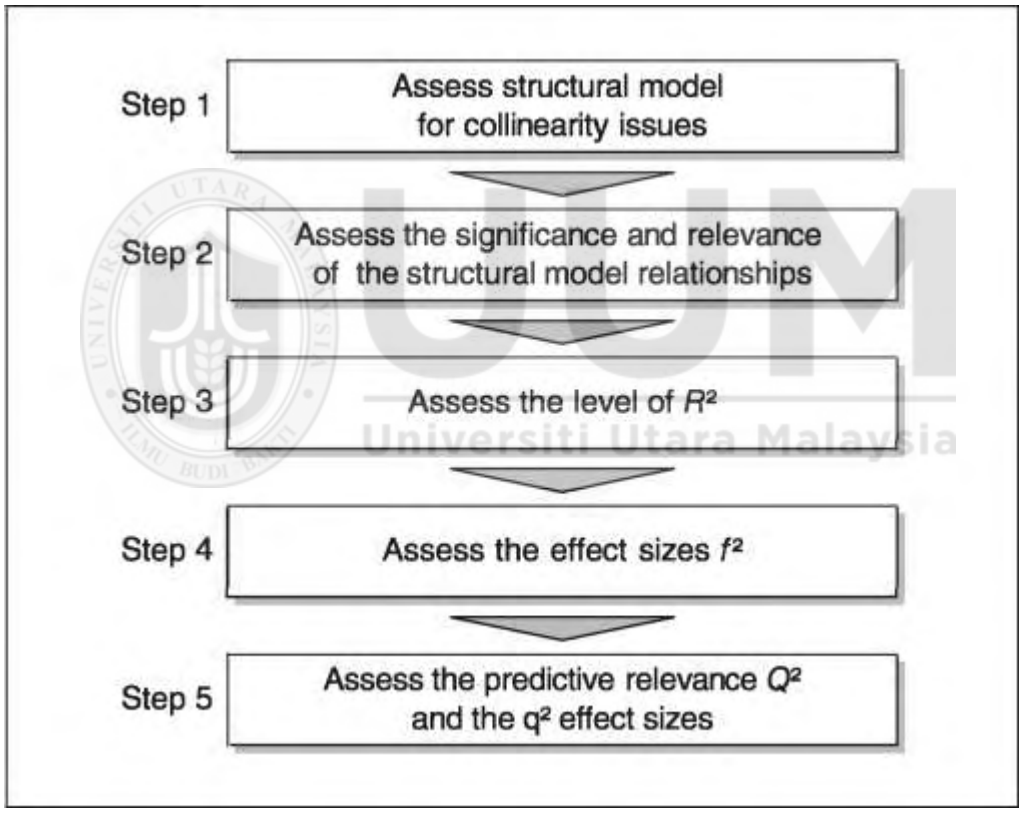


Figure 4.3
Structural Model Assessment Procedures
Source: Hair et al. (2014)

4.7 Measurement Model Analysis

Measurement model measures the relationships between the indicators and the constructs that enable researchers to evaluate the reliability and validity of the construct measures (Hair et al., 2014). A pretest on the measurement model (see Figure 4.4) was carried out before the actual assessment of the measurement model. The purpose of the pretest is to check the appropriateness of the data and it leads to the deletion of nine indicators in the reflective measurement model and two indicators in the formative measurement model from the final measurement model.

A total of nine indicators in the reflective measurement were deleted based on the Hair et al. (2014)'s suggestion and the deletion of these indicators will result to an increase in the average variance extracted (AVE) above 0.5. Besides, Hair et al. (2014) suggested that the removal of the indicator in the formative construct when the outer weight for the formative construct is not significant and the formative indicator's outer loading is smaller than 0.5, thus, two indicators in the formative measurement model were deleted.

Table 4.18
Deleted Indicators in the Pretest on the Measurement Model

Reflective Measurement Model	Formative Measurement Model
1. SCA Env 4	1. Dynamism 3
2. SCA Eco 1	2. Dynamism 4
3. SCA Social 2	
4. Knowledge Acq 3	
5. DC Sensing 2	
6. DC Sensing 1	
7. DC Seizing 2	
8. DC Reconfig 4	
9. DC Reconfig 3	

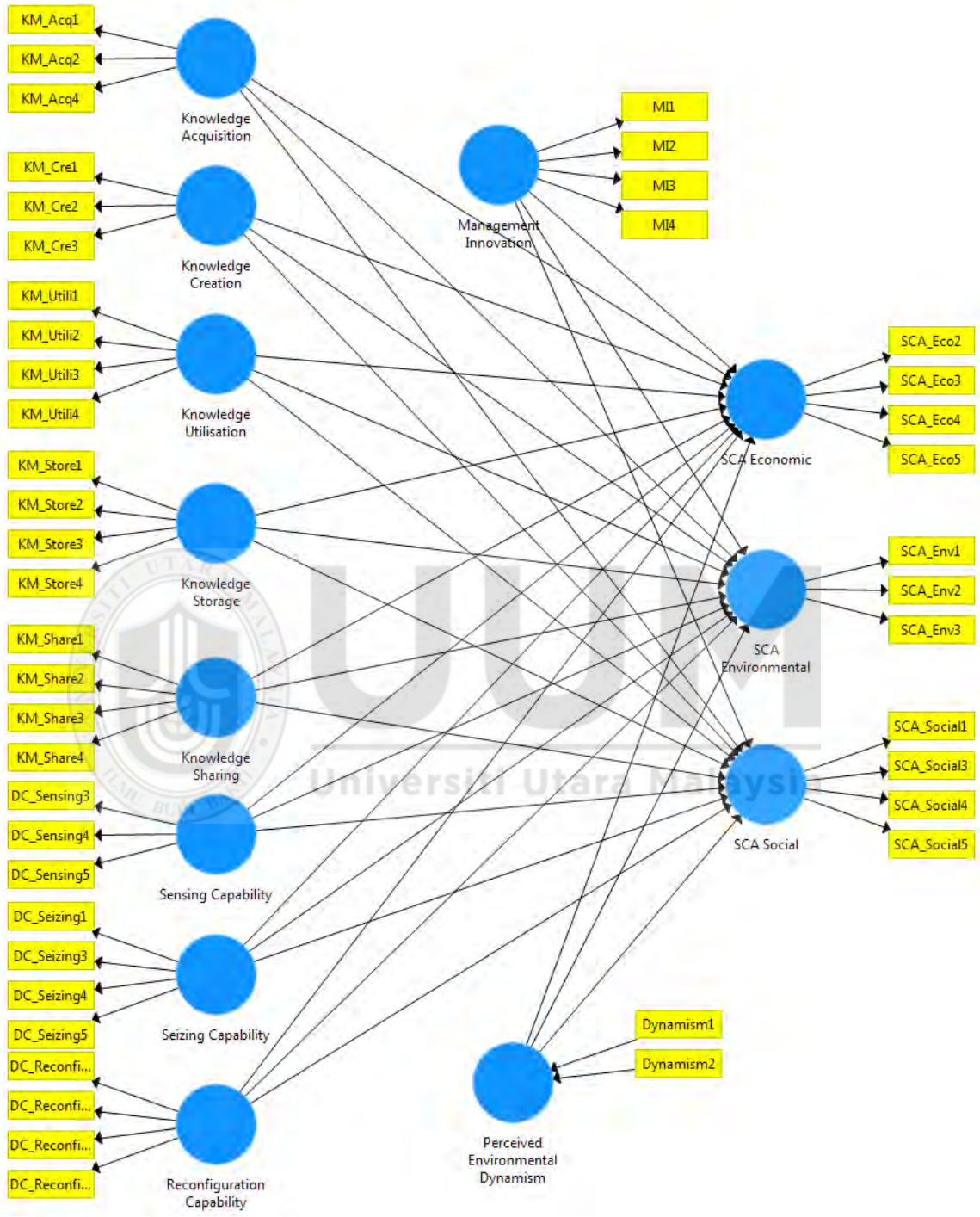


Figure 4.4
Pretest on the Measurement Model

4.7.1 Assessment of Reflective Measurement Model

After completing the pretest on the measurement model analysis, the data analysis continued with the assessment of reflective measurement model. In the current study, all the reflective constructs were first-order models, in which, they were studied as a single layer of constructs. The reflective measurement model is based on the assumption that all indicator items are derived from by the same constructs and individual items can be interchangeable. Apart from the internal consistency reliability, the reflective measurement model needs to be assessed for their internal consistency reliability and validity.

The first criterion to be examined in the assessment of reflective measurement mode is internal consistency reliability and it includes composite reliability to evaluate internal consistency. Convergent validity is "the extent to which a measure correlates positively with alternative measures of the same construct" (Hair et al., 2014, p. 102). As suggested by Hair et al. (2014), composite reliability, factor loadings, and AVE were used to assess the reflective measurement models and the results were summarised in Table 4.19 to Table 4.22.

All the loadings had exceeded the recommendation value of 0.708, except KM_Acq 1, KM_Utili 1, KM_Utili 3, KM_Share 2, DC_Sensing 1, DC_Sensing 3, DC_Reconfig 4, SCA_Eco 2, SCA_Social 1 and SCA_Social 3 (Hair et al., 2014). However, the items with loadings below 0.708 threshold were retained as these values were higher than 0.4 which is satisfactory and the summation of loadings also results in high loading scores, contributing to an increase in composite reliability (Hulland, 1999). Moreover, the results also indicate that all constructs meet the minimum value of composite reliability

and AVE, where all the composite reliability values are greater than 0.7 and all the AVE values are greater than 0.5. It is assumed that the requirement of reliability and convergent validity of these constructs are met at this stage.

Table 4.19
Quality Criteria of MI

Construct	Item	Loading	Composite Reliability	AVE	Convergent Validity (AVE>0.5)
MI	MI1	0.781	0.871	0.628	Yes
	MI2	0.792			
	MI3	0.808			
	MI4	0.789			

Table 4.20
Quality Criteria of Reflective First-Order Construct of KM

Construct	Item	Loading	Composite Reliability	AVE	Convergent Validity (AVE>0.5)
Knowledge Acquisition	KM_Acq 1	0.677	0.782	0.546	Yes
	KM_Acq 2	0.740			
	KM_Acq 3	0.795			
Knowledge Creation	KM_Cre 1	0.819	0.813	0.593	Yes
	KM_Cre 2	0.722			
	KM_Cre 3	0.766			
Knowledge Utilisation	KM_Utili 1	0.693	0.812	0.520	Yes
	KM_Utili 2	0.787			
	KM_Utili 3	0.674			
	KM_Utili 4	0.725			
Knowledge Storage	KM_Store 1	0.851	0.921	0.744	Yes
	KM_Store 2	0.854			
	KM_Store 3	0.890			
	KM_Store 4	0.854			
Knowledge Sharing	KM_Share 1	0.744	0.817	0.529	Yes
	KM_Share 2	0.654			
	KM_Share 3	0.788			
	KM_Share 4	0.718			

Table 4.21
Quality Criteria of Reflective First-Order Construct of DCs

Construct	Item	Loading	Composite Reliability	AVE	Convergent Validity (AVE>0.5)
Sensing Capability	DC_Sensing 1	0.667	0.769	0.530	Yes
	DC_Sensing 2	0.855			
	DC_Sensing 3	0.643			
Seizing Capability	DC_Seizing 1	0.707	0.815	0.524	Yes
	DC_Seizing 2	0.731			
	DC_Seizing 3	0.728			
	DC_Seizing 4	0.727			
Reconfiguration Capability	DC_Reconfig 1	0.685	0.810	0.516	Yes
	DC_Reconfig 2	0.721			
	DC_Reconfig 3	0.766			
	DC_Reconfig 4	0.70			

Table 4.22
Quality Criteria of Reflective First-Order Construct of SCA

Construct	Item	Loading	Composite Reliability	AVE	Convergent Validity (AVE>0.5)
Economic Performance	SCA_Eco 2	0.618	0.799	0.501	Yes
	SCA_Eco 3	0.681			
	SCA_Eco 4	0.762			
	SCA_Eco 5	0.759			
Environmental Performance	SCA_Env 1	0.904	0.904	0.760	Yes
	SCA_Env 2	0.884			
	SCA_Env 3	0.825			
Social Performance	SCA_Social 1	0.697	0.804	0.507	Yes
	SCA_Social 2	0.754			
	SCA_Social 3	0.680			
	SCA_Social 4	0.714			

Subsequently, the discriminant validity of the reflective model was assessed. Discriminant validity is "the extent to which a construct is truly distinct from others constructs by empirical standards" (Hair et al. 2014, p. 104). The Fornell-Larcker criterion and cross loadings are used to assess discriminant validity (Hair et al. 2014). The Fornell-Larcker criterion compares the square root of the AVE values with the latent variable correlations. Table 4.23 indicates that all construct exhibit satisfactory discriminant validity because the square root of AVE values of each reflective constructs is larger than the correlations with the remaining constructs in the model.

Also, the cross-loadings method was used to perform discriminant analysis by the comparison of the cross-loadings between the constructs. Each indicator's outer loading on a construct should be higher than all its cross-loadings with other constructs when using cross-loadings to assess the discriminant validity in the reflective measurement model (Hair et al. 2014). As indicated in Table 4.24, all the indicators' outer loadings on their associated construct are higher than all of its loadings on other constructs (i.e., the cross loadings). Hence, discriminant validity is established as the constructs are distinctly different from each other. The assessment of the measurement model was followed by the assessment of the formative measurement model.

Table 4.23
Fornell-Larcker criterion

	1	2	3	4	5	6	7	8	9	10	11	12
Knowledge Acquisition	**0.739**											
Knowledge Creation	0.7	**0.77**										
Knowledge Sharing	0.641	0.674	**0.727**									
Knowledge Storage	0.534	0.546	0.642	**0.863**								
Knowledge Utilisation	0.588	0.639	0.65	0.593	**0.721**							
Management Innovation	0.513	0.505	0.477	0.463	0.407	**0.793**						
Reconfiguration Capability	0.606	0.598	0.569	0.486	0.529	0.447	**0.719**					
SCA Economic	0.266	0.411	0.285	0.298	0.306	0.262	0.372	**0.708**				
SCA Environmental	0.276	0.28	0.228	0.082	0.203	0.16	0.199	0.055	**0.872**			
SCA Social	0.103	0.152	0.327	0.246	0.125	0.166	0.24	0.094	0.164	**0.712**		
Seizing Capability	0.616	0.576	0.603	0.494	0.604	0.487	0.623	0.38	0.182	0.067	**0.724**	
Sensing Capability	0.456	0.495	0.532	0.424	0.518	0.399	0.498	0.37	0.197	0.221	0.57	**0.728**

Note: 1.Knowledge Acquisition, 2. Knowledge Creation, 3. Knowledge Sharing, 4. Knowledge Storage, 5. Knowledge Utilisation, 6. Management Innovation, 7. Reconfiguration Capability, 8. SCA Economic, 9. SCA Environmental, 10. SCA Social, 11. Seizing Capability, 12. Sensing Capability

Table 4.24
Cross Loadings

	1	2	3	4	5	6	7	8	9	10	11	12
KM_Acq1	0.677	0.473	0.52	0.347	0.506	0.372	0.419	0.547	0.453	0.188	0.15	0.01
KM_Acq2	0.74	0.549	0.517	0.412	0.42	0.368	0.36	0.43	0.473	0.233	0.136	0.068
KM_Acq4	0.795	0.534	0.422	0.421	0.409	0.402	0.274	0.424	0.436	0.179	0.294	0.126
KM_Cre1	0.59	0.819	0.586	0.416	0.529	0.448	0.441	0.528	0.53	0.374	0.282	0.111
KM_Cre2	0.518	0.722	0.483	0.406	0.46	0.355	0.395	0.395	0.437	0.193	0.163	0.004
KM_Cre3	0.508	0.766	0.479	0.448	0.484	0.353	0.317	0.388	0.408	0.332	0.175	0.193
KM_Share1	0.46	0.472	0.744	0.477	0.518	0.338	0.365	0.514	0.383	0.195	0.139	0.261
KM_Share2	0.403	0.424	0.654	0.401	0.409	0.297	0.397	0.333	0.384	0.194	0.227	0.209
KM_Share3	0.518	0.578	0.788	0.494	0.517	0.439	0.41	0.521	0.487	0.209	0.208	0.196
KM_Share4	0.481	0.486	0.718	0.491	0.444	0.313	0.373	0.384	0.399	0.227	0.089	0.281
KM_Store1	0.498	0.501	0.591	0.851	0.539	0.443	0.355	0.421	0.41	0.245	0.115	0.195
KM_Store2	0.398	0.443	0.513	0.854	0.476	0.339	0.368	0.384	0.425	0.246	0.025	0.219
KM_Store3	0.461	0.448	0.573	0.89	0.466	0.4	0.371	0.402	0.397	0.176	0.069	0.253
KM_Store4	0.478	0.484	0.539	0.854	0.55	0.412	0.366	0.482	0.436	0.34	0.072	0.189
KM_Utili1	0.424	0.382	0.459	0.434	0.693	0.257	0.363	0.376	0.373	0.31	0.112	0.097
KM_Utili2	0.423	0.482	0.521	0.452	0.787	0.305	0.402	0.501	0.352	0.186	0.153	0.128
KM_Utili3	0.415	0.462	0.416	0.375	0.674	0.294	0.391	0.434	0.411	0.127	0.174	0.081
KM_Utili4	0.431	0.533	0.468	0.436	0.725	0.327	0.342	0.445	0.397	0.218	0.16	0.05

MI1	0.368	0.327	0.309	0.317	0.264	0.781	0.327	0.355	0.283	0.168	0.026	0.113
MI2	0.458	0.432	0.371	0.29	0.285	0.792	0.315	0.425	0.356	0.201	0.211	0.074
MI3	0.443	0.4	0.382	0.362	0.349	0.808	0.369	0.429	0.391	0.229	0.096	0.128
MI4	0.356	0.418	0.424	0.47	0.37	0.789	0.267	0.336	0.365	0.221	0.141	0.196
DC_Sensing3	0.372	0.341	0.442	0.282	0.375	0.286	0.667	0.392	0.436	0.267	0.071	0.207
DC_Sensing4	0.363	0.427	0.415	0.347	0.41	0.299	0.855	0.493	0.364	0.273	0.256	0.156
DC_Sensing5	0.253	0.302	0.297	0.293	0.343	0.289	0.643	0.347	0.284	0.272	0.079	0.118
DC_Seizing1	0.443	0.463	0.412	0.357	0.387	0.378	0.392	0.707	0.486	0.318	0.114	-0.027
DC_Seizing3	0.448	0.475	0.514	0.397	0.489	0.399	0.394	0.731	0.395	0.264	0.123	0.091
DC_Seizing4	0.465	0.368	0.399	0.339	0.41	0.323	0.432	0.728	0.465	0.289	0.144	0.053
DC_Seizing5	0.421	0.353	0.423	0.335	0.472	0.304	0.434	0.727	0.452	0.217	0.146	0.088
DC_Reconfig1	0.428	0.444	0.476	0.385	0.446	0.338	0.346	0.387	0.685	0.199	0.109	0.192
DC_Reconfig2	0.53	0.505	0.408	0.42	0.373	0.407	0.372	0.507	0.721	0.24	0.172	0.107
DC_Reconfig5	0.368	0.365	0.383	0.294	0.312	0.252	0.36	0.425	0.766	0.37	0.181	0.169
DC_Reconfig6	0.457	0.442	0.395	0.333	0.431	0.329	0.36	0.489	0.7	0.223	0.099	0.225
SCA_Eco2	0.196	0.262	0.274	0.22	0.302	0.221	0.215	0.288	0.21	0.618	-0.019	0.027
SCA_Eco3	0.196	0.235	0.156	0.189	0.204	0.207	0.179	0.221	0.248	0.681	0.032	0.02
SCA_Eco4	0.139	0.298	0.145	0.15	0.181	0.055	0.273	0.262	0.212	0.762	0.004	0.022
SCA_Eco5	0.225	0.348	0.233	0.275	0.201	0.262	0.343	0.299	0.36	0.759	0.112	0.161
SCA_Env1	0.298	0.274	0.191	0.075	0.215	0.196	0.21	0.208	0.163	0.098	0.904	0.133

SCA_Env2	0.221	0.192	0.167	0.063	0.157	0.097	0.193	0.133	0.17	0.005	0.884	0.085
SCA_Env3	0.188	0.257	0.24	0.075	0.15	0.112	0.103	0.122	0.192	0.027	0.825	0.212
SCA_Social1	0.11	0.15	0.249	0.216	0.142	0.135	0.172	0.129	0.27	0.197	0.051	0.697
SCA_Social3	0.045	0.119	0.222	0.16	0.025	0.184	0.222	0.032	0.21	0.005	0.175	0.754
SCA_Social4	0.058	0.065	0.213	0.169	0.058	0.045	0.126	0.037	0.103	0.093	0.049	0.68
SCA_Social5	0.08	0.08	0.25	0.154	0.141	0.075	0.079	-0.024	0.053	-0.041	0.19	0.714

Note: 1.Knowledge Acquisition, 2. Knowledge Creation, 3. Knowledge Sharing, 4. Knowledge Storage, 5. Knowledge Utilisation, 6. Management Innovation, 7. Reconfiguration Capability, 8. SCA Economic, 9. SCA Environmental, 10. SCA Social, 11. Seizing Capability, 12. Sensing Capability

4.7.2 Assessment of Formative Measurement Model

Formative measurement model assumes a different epistemic relationship between the construct and its indicators by assuming that indicators are the immediate causes of the latent variable (Henseler, 2017). Since the formative indicators represent the construct's independent causes, thus, the formative indicators do not substantially interchangeable (Hair et al., 2014). Internal consistency reliability and construct validity in the reflective measurement model are not meaningful for the formative measurement model as there is no reason for high correlations between the formative indicators (Fassott & Henseler, 2015).

Hence, the internal consistency reliability, convergent validity and discriminant validity used in reflective measurement model evaluation cannot be applied to formative models since formative measures do not necessarily highly correlated (Hair et al., 2014). As such, the assessment of formative measurement model requires a different approach. The assessment of formative measurement models includes indicator collinearity, and the statistical significance and relevance of the indicator weights.

The formative indicators are estimated by means of multiple regressions, the weighting coefficients were subjected to multicollinearity issues (Fassott & Henseler, 2015). High correlations between the formative indicators are critical issues because they will impact the estimation of weight and their statistical significance (Hair et al., 2014). Variance Inflation Factor (VIF) is used to assess the collinearity issues among the formative indicators. Based on the results shown in Table 4.25, both indicators have VIF values of 1.185, which are under the suggested threshold value of 5. Hence, collinearity is not a problem for the evaluation of the formatively measured constructs.

Having dealt with the indicator collinearity, the following step in assessing formatively measured constructs is examining the statistical significance and relevance of the indicator weights. Instead of the outer loadings in the reflective measurement model, outer weight is an essential criterion for assessing the significance and relevance of a formative indicator (Hair et al., 2014). Bootstrapping technique was used to determine the level of significance of each indicator weight and the significance of each parameter that can be determined using t-value (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014). Based on the result shown in Table 4.25, one of the formative indicators is not significant. However, the outer loading for the insignificant indicator is above 0.5 and also significant at t-value>1.96. Thus, the indicator was retained for further data analysis.

Table 4.25
Measurement Properties for First-order Formative Construct

Construct	Items	Weights (Outer Loadings)	VIF	t-value weights	Sig
PED	Dynamism_1	0.736 (0.912)	1.185	3.399**	0.001
	Dynamism_2	0.446 (0.737)	1.185	1.832	0.067

Note:>1.96**

4.7.3 Assessment of Second-Order Formative Measurement Model

After done with the first-order model, the assessment was carried on with the second-order models that involve testing the second-order structures that contain two layers of items. In this study, KM, DCs, and SCA are measured as multidimensional second-order constructs. All the second order constructs in this study were operationalised as a Type II, namely reflective-formative measurement model.

This study followed Becker, Klein, & Wetzels (2012)'s procedures to estimate the HCMs (i.e., KM, DCs, and SCA) using a two-stage approach. In the first stage, the first-order reflective constructs (i.e., Knowledge Acquisition, Knowledge Creation, Knowledge Sharing, Knowledge Storage, Knowledge Utilisation, Reconfiguration Capability, Seizing Capability, and Sensing Capability) were connected to the endogenous constructs (i.e., Economic, Environmental, and Social Performance) without the presence of second-order construct in order to get the latent variable score of each first-order constructs. Subsequently, the LVS were saved and used as the formative indicators for the second-order constructs in the separate second-stage analysis. Meanwhile, a new measurement model was created in the second-stage analysis and the assessment of second-order formative measurement model includes examine collinearity issues and assesses the significance and relevance of the formative indicators. Figure 4.5 depicts the second order measurement model of this study.

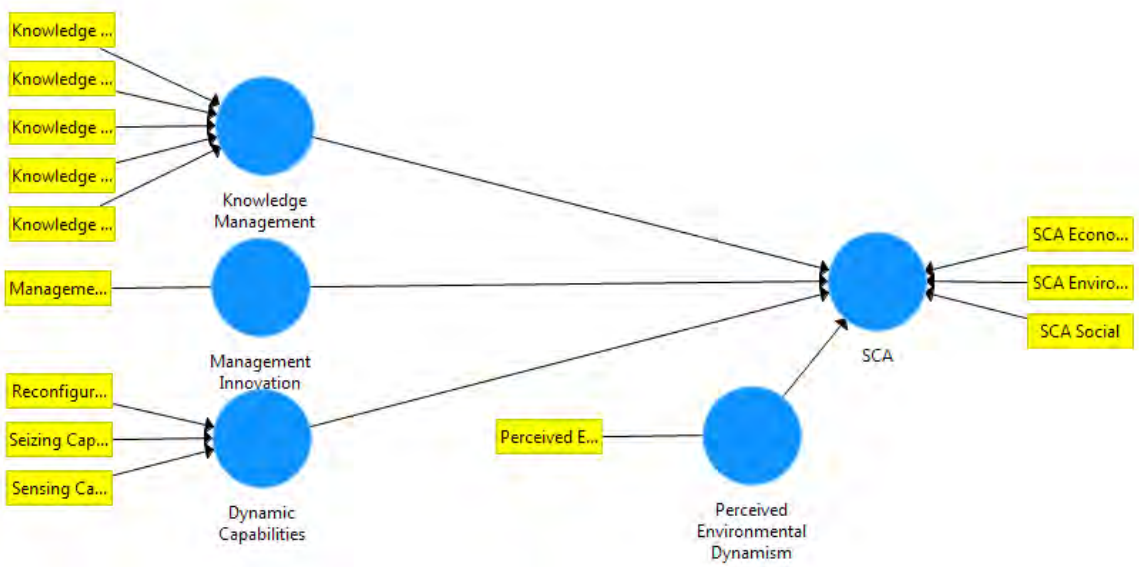


Figure 4.5
Second Order Measurement Model

Based on the results shown in Table 4.26, VIF values are under the suggested threshold value of 5. Hence, collinearity is not a problem for the evaluation of the second-order measurement model. Furthermore, Table 4.26 depicts that six out of eleven second-order formative indicators are highly significant at 95 per cent confidence level. Since the outer loading for the insignificant second-order formative indicator is above 0.5 and also significant at t-value>1.96, the insignificant second-order formative indicators were retained for assessment of the structural model. The final structure measurement model of this study, SCA consists of three dimensions, namely economic performance, environmental performance and social performance; KM consists of five dimensions, namely knowledge acquisition, knowledge creation, knowledge utilisation, knowledge storage and knowledge sharing; while DCs include three dimensions of sensing capability, seizing capability and reconfiguring capability.

Table 4.26

Measurement Properties for Second-order Formative Construct

Construct	Items	Weights (Outer Loadings)	VIF	t-value weights	Sig
KM	Knowledge Acquisition	-0.122 (0.685)	2.258	0.518	0.605
	Knowledge Creation	0.717 (0.951)	2.537	3.127**	0.002
	Knowledge Utilisation	0.327 (0.712)	2.151	0.099	0.921
	Knowledge Storage	0.157 (0.705)	1.908	0.809	0.419
	Knowledge Sharing	0.021 (0.846)	2.556	1.106	0.269
DCs	Sensing Capabilities	0.543 (0.852)	1.558	3.086**	0.002
	Seizing Capabilities	0.115 (0.748)	1.916	0.593	0.554
	Reconfiguration Capabilities	0.517 (0.872)	1.178	3.389**	0.001
SCA	Economic Performance	0.783 (0.837)	1.01	7.582**	0.000
	Environmental Performance	0.352 (0.456)	1.029	2.790**	0.005
	Social Performance	0.369 (0.500)	1.035	2.168**	0.031

*Note:>1.96***

4.8 Assessment of Structural Model

Once the reliability and validity measurements of the model have been established, the next step is to interpret the structural model results by examining the relationships between the constructs and the model's predictive capabilities. Figure 4.6 depicts the structural model of this study.

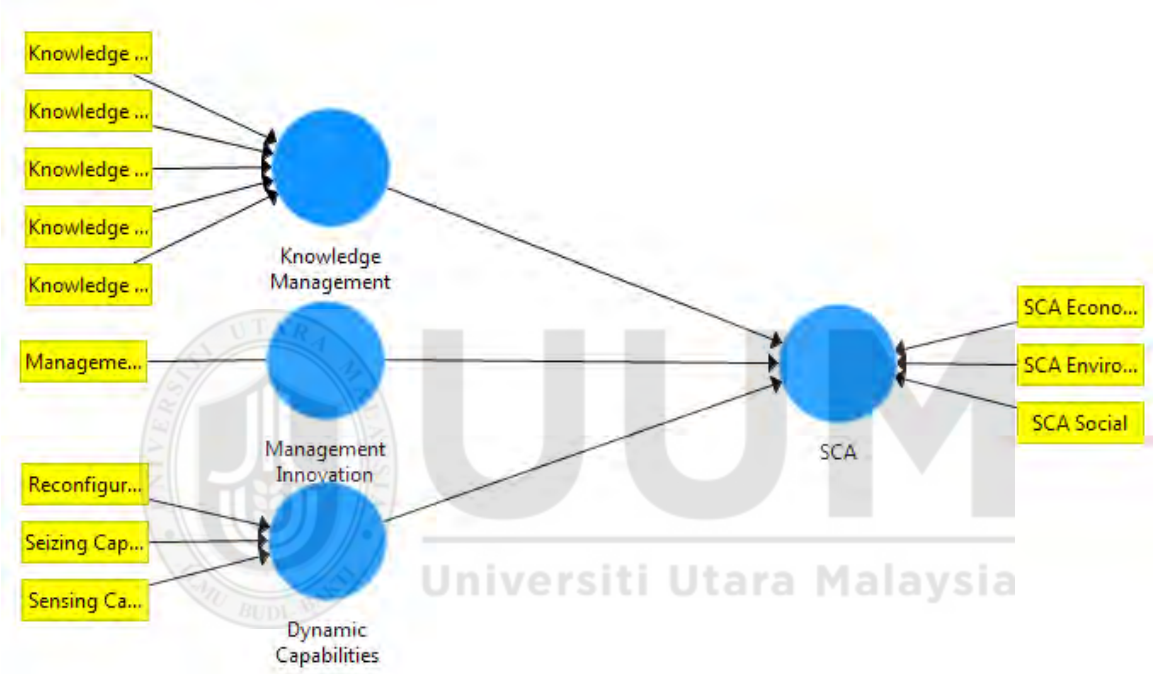


Figure 4.6
Structural Model

4.8.1 Collinearity Assessment

In the initial stage of assessing the structural model, it is crucial to ensure that there is no lateral collinearity issue in the structural model (Ramayah, Cheah, Chuah, Ting, & Mumtaz, 2016). The reason is that the estimation that involves the significant level of collinearity among the predicting constructs might cause path coefficients bias in the structural model since PLS-SEM is based on the OLS regressions of each endogenous latent variable on its corresponding predecessor constructs.

In order to assess the structural model for collinearity issue, VIF values are used since the VIF value is important for assessing the collinearity issues in the structural model (Hair et al., 2014). Table 4.27 shows the result of the collinearity test and the VIF values of KM, MI and DCs are found to be lower than the threshold value 5. Therefore, the collinearity issue is not a concern in the assessment of the structural model continued with the path coefficient estimates of the structural model.

Table 4.27
Collinearity Assessment

Construct	SCA (VIF)
KM	2.152
MI	1.475
DCs	2.058

4.8.2 Structural Model Path Coefficients

The assessment of the path coefficient estimate is to assess the significance of the hypothesised relationships among the variables. The significance of the path coefficients depends on its standard error that is obtained by means of bootstrapping and bootstrap

standard error allows the calculation of the t-values (Hair et al., 2014). Three hypotheses were developed to study the relationships between the variables:

H_1: KM processes have a significant effect on the SCA of the Malaysian E&E manufacturing firms.

H_2: MI has a significant effect on the SCA of the Malaysian E&E manufacturing firms.

H_3: DCs have a significant effect on the SCA of the Malaysian E&E manufacturing firms.

In order to test the significance level, t-statistics for all paths are generated using Smart PLS 3.0 bootstrapping function. Table 4.28 presents the outcome of path coefficient assessment results for the hypothesised relationships. Two of the hypothesised relationships are significant at 99 per cent confidence level (p-value<0.01) with the t-value of 2.819 and 3.465. This indicates that H_1 and H_3 are supported.

Table 4.28
Hypotheses Testing

	Std Beta	Standard Error	T-statistic	p-value	Result	R^2	f^2
KM->SCA	0.269	0.096	2.819**	0.005	Significant	0.305	0.071
MI->SCA	0.017	0.075	0.221	0.825	Not Significant		0.048
DC->SCA	0.319	0.092	3.465**	0.001	Significant		0.000

*Note: **p<0.01, *p<0.05*

4.8.3 Coefficient of Determination (R^2 Value)

Model's predictive accuracy in the structural model is evaluated via the coefficient of determination (R^2). R^2 is "a measure of the proportion of an endogenous construct's variance that is explained by its predictor constructs" (Hair et al., 2014, p. 115). Table 4.28 illustrates the R^2 value for the endogenous construct of SCA. The R^2 value of 0.305 implies a weak model. Hence, the strength of the relationship between KM, MI, DCs and SCA is weak.

4.8.4 Effect Sizes f^2

As asserted by Sullivan and Feinn (2012), p-value will reveal whether an effect exists but not the size of the effect. Hence, Sullivan and Feinn (2012) stated that substantive significance (effect size) is essential in reporting and interpreting the structural model. The assessment of effect size f^2 is to evaluate "the change in the R^2 value when a specified exogenous construct is omitted from the model" (Hair et al., 2014, p.177). In other words, the assessment of effect sizes seeks to examine the substantive impact of exogenous construct on the endogenous construct. Cohen 's (1988) guideline is used to interpret the effect size, the value of 0.02 represents small effect, 0.15 represents medium effect, and 0.35 represents large effect.

From Table 4.28, the effect size of KM (0.071) and DCs (0.048) are above 0.02 which indicate to have small to medium effect size on SCA while MI (0.000) with the effect size value of less than 0.02 which indicates there is no effect when the MI construct being removed from the structural model.

4.9 Assessment of Moderating Effects

After done with the assessments of the structural model, the data analysis continued with the analysis of the moderating effect of PED. Besides the examination of direct effect, moderating effect is "evoked by variables whose variation affects the strength of a relation between an independent and a dependent variable" (Baron & Kenny, 1986, p. 1174). Three hypotheses were developed to assess the moderating effect of PED. The hypotheses were:

H_4: PED has a moderating effect between KM processes and SCA of the Malaysian E&E manufacturing firms.

H_5: PED has a moderating effect between MI and SCA of the Malaysian E&E manufacturing firms.

H_6: PED has a moderating effect between DCs and SCA of the Malaysian E&E manufacturing firms.

Table 4.29 depicts the result of the moderating effect assessment. The interaction effect results suggested that all three hypothesised moderating effects of PED are not present. Hence, it is assumed that the strength of the relationship between the multiple firm-level capabilities (i.e., KM, MI, and MI) and SCA in this study is constant.

Table 4.29
Moderating Effect of PED

	Std Beta	Standard Error	T-statistic	p-value	Result
KM*PED->SCA	-0.056	0.100	0.558	0.289	Not
MI*PED->SCA	0.029	0.083	0.352	0.362	Significant
DC*PED->SCA	0.063	0.094	0.670	0.252	

4.10 Summary of Chapter

This chapter exhibits the empirical results of this study. Firstly, the response rate and non-response bias test results are reported. Subsequently, data screening in which the raw data are checked before the main analysis is conducted. Lastly, the proposed hypothesised model of factors and the moderator was empirically examined using the PLS-SEM technique. Discussion of the empirical results is presented in the next chapter. Chapter 5 also highlights the implications, contributions and limitations of this study, as well as recommendations for future research.

CHAPTER FIVE

DISCUSSIONS AND CONCLUSION

5.1 Introduction

This final chapter discusses the results obtained from the statistical analysis in Chapter Four and concludes the findings of this study. The first section provides an overview of the research. The second section provides interpretations of the findings put forth in Chapter Four, which in turn provide answers for the four main research questions presented in Chapter One. The third section depicts the theoretical and managerial implications of this research. Following that, the fourth section highlights the limitations and suggestions for future research on the area of research. Finally, this study culminates with summary of the chapter.

5.2 Summary of Thesis

The current study examined the impact of multiple firm-level capabilities (i.e., KM, MI, and DCs) on the Malaysian E&E manufacturing firms' SCA. Specifically, SCA was measured by economic performance, environmental performance, and social performance. PED was proposed to moderate the relationship between the independent variables and dependent variable.

Building upon the past literature, RBT is the underpinning theory of the overall research framework, additional supporting theories, namely stakeholder theory and DCV were used to provide additional explanation to the theorised relationships. Stakeholder theory

calls for the importance of social and environmental aspects to achieve SCA while the moderating effect of PED was supported by DCV.

The study was an organisational-level study, where the managers of Malaysian E&E manufacturing firms were used as key informants to respond to the survey. They were most qualified to comment on organisation-wide phenomena of their firms, given their prominent roles in the firm allows them to understand the implicit processes underlying the internal resource and capabilities of their firms. Lastly, two out of the six hypotheses tested were supported.

5.3 Discussion of Findings

The discussion of the findings of this study was organised according to the flow of the four main research objectives. Table 5.1 recaps the research objectives, and their corresponding research questions and hypotheses.

Table 5.1

Summary of Research Objectives, Research Questions and Hypotheses

Research Questions	Research Objectives	Hypotheses
1. Do KM processes have any significant influence on the SCA of the Malaysian E&E manufacturing firms?	To examine the effect of KM processes on SCA of the Malaysian E&E manufacturing firms.	H_1: KM processes have a significant effect on the SCA of the Malaysian E&E manufacturing firms.
2. Does MI have any significant influence on the SCA of the Malaysian E&E manufacturing firms?	To examine the effect of MI on SCA of the Malaysian E&E manufacturing firms.	H_2: MI has a significant effect on the SCA of the Malaysian E&E manufacturing firms.
3. Do DCs have any significant influence on the SCA of the Malaysian E&E manufacturing firms?	To examine the effect of DCs on SCA of the Malaysian E&E manufacturing firms.	H_3: DCs have a significant effect on the SCA of the Malaysian E&E manufacturing firms.
4. Does PED moderate the effect of KM processes on SCA of the Malaysian E&E manufacturing firms?	To examine the moderating effect of PED on the effect of KM processes and SCA of the Malaysian E&E manufacturing firms.	H_4: PED has a moderating effect between KM processes and SCA of the Malaysian E&E manufacturing firms.
5. Does PED moderate the effect of MI on SCA of the Malaysian E&E manufacturing firms?	To examine the moderating effect of PED on the effect of MI and SCA of the Malaysian E&E manufacturing firms.	H_5: PED has a moderating effect between MI and SCA of the Malaysian E&E manufacturing firms.
6. Does PED moderate the effect of DCs on SCA of the Malaysian E&E manufacturing firms?	To examine the moderating effect of PED on the effect of DCs and SCA of the Malaysian E&E manufacturing firms.	H_6: PED has a moderating effect between DCs and SCA of the Malaysian E&E manufacturing firms.

5.3.1 Knowledge Management

The first research objective of the current research was to examine the effect of KM processes on SCA of the Malaysian E&E manufacturing firms. The objective aimed to examine whether KM can be a good predictor for the Malaysian E&E manufacturing firms to sustain their competitive advantage over competitors in the long run. Based on prior literature reviews, KM was hypothesised to have a significant relationship with SCA.

In the knowledge-based economy, knowledge is the most important resource owned by firms. From the RBT perspective, knowledge and effective management of knowledge have been known as a valuable and important competitive asset for business firms to sustain their competitive advantage over competitors in the current dynamic and competitive era. Hence, business firms should manage their knowledge assets in an organised manner and processing them effectively in order to harness the real value of the knowledge. In other words, business firms that successfully manage their knowledge can sustain their competitive advantage over their competitors.

KM in this study was examined as a multidimensional construct compassing five dimensions, namely knowledge acquisition, knowledge creation, knowledge utilisation, knowledge storage and knowledge sharing. The analysis results in this study found that KM is significantly related to SCA and the relationship between them was positively correlated. As evident from the results of this study, KM is a good predictor for the Malaysian E&E manufacturing firms to sustain their competitive advantage in the long run. Besides, the significant result found in this study supports the theoretical literature (Johannessen & Olsen, 2003; Lubit, 2001) and it is consistent with the RBT, as business

firms can sustain their competitive advantage through the deployment tangible and intangible resources, and utilise firms' capabilities that are VRIN.

Further, the significant result in this study is consistent with past empirical works which demonstrated KM is positive correlated with competitive advantage (Mao, Liu, Zhang, & Deng, 2016; Ngah, Salleh, Ab Wahab, & Azman, 2016) and organisational performance (Gold et al., 2001; Mills & Smith, 2011; Pérez-López & Alegre, 2012; Tseng, 2014). Take a recent study of Mao et al. (2016) who found KM capability is positively associated with competitive advantage. In their study, a sample of 168 organisations from China provided empirical evidence that information technology resources positively affect KM capability, which is also positively related to competitive advantage. Similarly, Tseng (2014) attempted to explore the relationship between KM capability, supplier relationship management and corporate performance and found that KM capabilities influenced corporate performance positively.

Likewise, this finding is also consistent with existing research conducted in Malaysia. Ngah, Salleh, Ab Wahab, and Azman (2016) found a significant and positive association between KM and SCA. In their cross-sectional study, KM is included to mediate the relationship between intellectual capital and SCA among Malaysian small and medium enterprises (SME). However, the KM did not mediate the relationship between intellectual capital and SCA.

Above all, this study identified the vital role of KM in sustaining the competitive advantage of Malaysia's E&E industry since the results of the study show that KM has a significant and positive effect on the SCA of E&E industry in Malaysia. In other words,

the results of the current study and past empirical works affirm that knowledge is the strategic resources the firm must possess and KM is an important source of SCA. That is to say, it is important for the Malaysian E&E manufacturing firms to manage their knowledge in order to sustain their competitive advantage over competitors in the long run.

5.3.2 Management Innovation

The second research objective of the current research was to examine the effect of MI on SCA of the Malaysian E&E manufacturing firms. The objective aimed to examine whether MI can be a good predictor for the Malaysian E&E manufacturing firms to sustain their competitive advantage. Based on prior literature reviews, MI was hypothesised to have a significant relationship with SCA.

The ability of business firms to innovate becomes a critical element of realising SCA (Nieves, 2016). Nowadays, business firms' innovative challenge concentrates not only on endeavouring technological innovation but also on non-technological innovation. Non-technological innovation includes marketing innovation and organisational (or management) innovation. To be specific, MI is the introduction of management practices, processes, or structures that are new to the firm. From the RBT perspective, MI is able to enhance firms' ability to sustain its competitive advantage since this type of innovation usually is relatively abstract and intangible, which mean it can be complex and ambiguous.

MI in this study was examined based on what was defined in the Oslo Manual. The analysis results in the current study found that MI was positively related to SCA;

however, the relationship between them was not significant. From a practical point of view, the result shows that MI is not a good predictor to predict Malaysian E&E manufacturing firms' ability to sustain their competitive advantage. Furthermore, the non-significant result found in this study fails to support the theoretical literature (Birkinshaw et al., 2008; Hamel, 2006) and is not consistent with the RBT even that MI usually is relatively abstract and intangible.

Further, the non-significant result in this study is not consistent with past empirical work which demonstrated MI is positively correlated with the SCA (Camisén & Villar-López, 2011). In their study, 159 industrial firms in Spain were sampled and the PLS results confirmed that learning capabilities and organisational memory favour the development of non-technical innovation (i.e., organisational innovation and marketing innovation) and both types of non-technical innovation promote the achievement of SCA. Besides, Mol and Birkinshaw (2009) found that the introduction of new management practices is positively associated with firm performance using a sample of firms from the United Kingdom.

In the context of Malaysian E&E manufacturing firms, Malaysian E&E manufacturing firms have progressed at different levels of innovation activities and the innovation agenda remains driven by MNCs (Loke & Abu, 2017). One probable reason that MI is not a significant predictor of SCA is that MIs are perceived less critical than technological innovations because the association between them and SCA is less clear and precise (Damanpour, 2014). In other words, MIs are perceived as a secondary factor the business firms to facilitate technological innovations (Damanpour, 2014). With the lower perceived impact of MI, Damanpour (2014) furthered his discussion by pointing

out the business firms will lower the presumed capacity of MI to help the organisation in achieving its strategies and performance goals which, in turns, resulting MIs receive less managerial attention and commitment.

Another probable reason is the creation of innovative managerial concepts lies in the internal environment of the business firms and MI is not a product or service that is delivered to the market (Magnier-Watanabe & Benton, 2017). Thus, from the subtheme within the rational perspective on MI, it should be introduced along with the technological innovation concurrently because new management activities are necessitated for facilitating technological innovation (Birkinshaw et al., 2008). In addition, technological and MIs should be introduced together as each could not have optimum performance effects without the other (Damanpour, 2014; Damanpour & Evan, 1984). For example, a new product that is based on a new production process may require the combination of the product/process innovation and new management practices. From the RBT perspective, synchronous introduction of technological and MI in tandem has synergistic effects that will form complex interrelationships which are difficult for the competitors to imitate and enhance the firm's SCA (Hervas-Oliver et al., 2017; Hervas-Oliver, Sempere-Ripoll, Boronat-Moll, & Rojas, 2015).

In other words, both technological and non-technological innovation are complementary and they should be recognised as related sets (Damanpour, 2014). More importantly, the roles or contributions of them cannot be precisely described without an understanding of their interrelationships (Damanpour, 2014). Theoretically, this view is in line with the argumentation approach proposed by DCs, which put forth that both technological and non-technological innovation capabilities are the means of the renewal of the capabilities

across the whole organisation (Walker et al., 2015). For example, Hervas-Oliver, Sempere-Ripoll, Boronat-Moll, and Rojas-Alvarado (2017) in their latest study based on 12,563 Spanish firms, suggested business firms should pursue both technological innovation and MI simultaneously. Similarly, Černe, Jaklič, and Škerlavaj (2015) found that MI mediated the relationship between technological innovation and financial performance, and subsequently pointed out that business firms can organise innovation processes efficiently by combining both technological innovation and MI in order to outperform competitors that only introduce a new process innovation but without any MI.

In addition, past studies also provide consistent results with this study to support that MI is not correlated with organisational outcomes (Atalay, Anafarta, & Sarvan, 2013; Magnier-Watanabe & Benton, 2017; Nieves, 2016). For instance, Magnier-Watanabe and Benton, (2017) found that there was no direct effect of MI on firm performance but the alignment of MI with tacit and explicit knowledge enhanced the firm performance in Japanese business firms. Their study highlighted the role of tacit and explicit knowledge in translating MI that enhances firm performance. Nieves (2016) also found that MI is not correlated to financial performance; however, there is only an indirect effect through product innovation.

Above all, the result of the current study affirms that MI alone will not lead to SCA in Malaysian E&E manufacturing firms. Based on existing literature, henceforth, Malaysian E&E manufacturing firms should consider adopting both technological innovation and MI in order to outperform their competitors. However, a more in-depth understanding of MI is called for. This is because empirical studies of MIs that perceived to undergird

SCA demands more research and in-depth understanding of MI will be useful for researchers to explain its role in achieving firm's SCA.

5.3.3 Dynamic Capabilities

The third research objective of the current research was to examine the effect of DCs on SCA of the Malaysian E&E manufacturing firms. The objective aimed to examine whether DCs can be a good predictor for the Malaysian E&E manufacturing firms to sustain their competitive advantage. Based on prior literature reviews, DCs were hypothesised to have a significant relationship with SCA.

DCV is an extension of the RBT and DCs are commonly viewed to reconfigure resources and capabilities that enable business firms to enhance their SCA over time effectively. Hence, the DCs framework has emerged as one of the pre-eminent frameworks in the field of strategic management (G. Di Stefano et al., 2010). It attempts to explain long-run growth and firm survival (or failure) by depicting how the firms sense and seize opportunities and reconfigure their resource base in order to cope with a dynamic environment (Teece, 2007).

DCs in this study were examined as a multidimensional construct compassing three dimensions, namely sensing, seizing and reconfiguration capability. The analysis results in this study found that DCs were positively related to SCA and the relationship between them was statistically significant. From the practical point of view, the result shows that DCs are a good predictor for the Malaysian E&E manufacturing firms to enhance their SCA. Besides, the significant result found in this study supports past literature (Teece, 2007; Teece et al., 1997) and is consistent with the DCV, as the business firms can

sustain their competitive advantage over competitors through sensing and seizing opportunities and reconfiguring the organisational resource base to compete in the global marketplace.

Further, the significant result in this study is consistent with past empirical works which demonstrated DCs are positively correlated with competitive advantage (Li & Liu, 2014; Schilke, 2014). It is important to note that DCs are a broad construct (Fainshmidt et al., 2016). Hence, it is not surprising that past empirical works on DCs stretch over a variety of capabilities. For instance, Li and Liu (2014) defined DCs as the "firms' potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely decisions, and to implement strategic decisions and changes efficiently to ensure the right direction" (p. 2793). In their study, Li and Liu (2014) found that DCs do significantly positively affect competitive advantage with an empirical study of 217 enterprises in China. Based on longitudinal key informant data from 279 firms, Schilke (2014) found strong support that the two DCs (i.e., alliance management capability and new product development capability) would have the most substantial positive impact on competitive advantage under intermediate levels of environmental dynamism.

Interestingly, Wilden, Gudergan, Nielsen, and Lings (2013) also measured DCs as a multidimensional construct (i.e., sensing capability, seizing capability and reconfiguration capability) which is similar to the operationalisation of DCs in this study. The results of PLS-SEM indicated that the DCs did not have a significant direct effect on financial solvency and a direct negative effect on sales growth. Hence, they furthered the analyses with the moderator and they found the effect of DCs on the firm's financial solvency turned positive if the more organically an organisation is structured.

Furthermore, DCs have a positive effect on both sales growth and financial solvency when the firms were faced with increasing levels of competitive intensity.

Above all, the results of the current study and past empirical works affirm that DCs (i.e., sensing capability, seizing capability and reconfiguration capability) are important sources that undergird SCA. More specifically, DCs generate new, valuable, rare and hard-to-imitate resource configurations and the business firms are also more likely to achieve SCA. That is to say, it is important for the Malaysian E&E manufacturing firms to develop their DCs in order to sustain their competitive advantage over their competitors.

5.3.4 Perceived Environmental Dynamism

The fourth research objective of the current research was to examine the moderating effect of PED and three hypotheses for the moderating effects were formulated in this study and all the hypotheses were found to be non-significant. The discussions of the moderating are per detailed separately as follow.

The moderating effect of PED between KM and SCA was corresponded by hypothesis H_4. The results of this study do not provide evidence to claim the existence of a significant moderating effect of PED between KM and SCA. This finding is consistent with Martinez-Conesa, Soto-Acosta, and Carayannis's (2017) study, although not focusing on SCA, they found that the moderating effect of PED does not strengthen the positive effect of KM on the performance outcomes. A probable explanation of this finding is that the environmental factors may prompt business firms to sustain their competitive advantages based on what they know (Johannessen & Olsen, 2003), which the use of knowledge on

an on-going basis underpins the business firms' SCA (Easterby-Smith & Prieto, 2008). However, knowledge may not provide value directly on their own but instead need to be processed or utilised in bundles in order to deliver its value (Newbert, 2007). Hence, KM is important for business firms to sustain their competitive advantage regardless of whether the firms operate in low or high dynamic business environments.

The moderating effect of PED between MI and SCA was corresponded by hypothesis H_5. The results of this study also do not provide evidence to claim the existence of a significant moderating effect of PED between MI and SCA. This finding is similar to Camisón, Villar-López (2011) as they found environmental complexity did not moderate the relationship between non-technical innovation (i.e., organisational innovation and marketing innovation) and sustained competitive advantage. Similarly, this finding also coincides with results from García-Zamora, González-Benito, and Muñoz-Gallego (2013), although not focusing on SCA, they did not find any moderating effects of PED between MI and performance outcomes (i.e., profitability, market response and new product success). A probable explanation of this finding is that MI allows the business firms to adapt to rapid and even disruptive changes. Changing in the nature of management within organisations also provides a means to actively drive and shape the other innovations to enhance the SCA (Hecker & Ganter, 2013). Hence, organising MI in a competitive environment characterised by continual change is important for business firms to sustain their competitive advantage regardless of whether the firms operate in low or high dynamic business environments.

The moderating effect of PED between DCs and SCA was corresponded by hypothesis H_6. Despite Wilhelm, Schlömer, and Maurer's (2015) study stated that DCs have different

effects in high and low dynamic environments. However, the results of this study do not provide evidence to claim the existence of a significant moderating effect of PED between DCs and SCA. This finding is consistent with existing research which found PED does not moderate the relationship between DCs and competitive advantage (Li & Liu, 2014). A probable explanation of this finding is that DCs facilitate the creation of value, but the value created by DCs is lasting only for a short time (Eisenhardt & Martin, 2000; Fainshmidt et al., 2016). This is because DCs are highly unstable and duration of competitive advantage is uncertain. However, it indirectly enhances the firm's competitiveness (Eisenhardt & Martin, 2000). As a result, business firms have to deploy their DCs to renew and generate their resource base regularly in order to respond to operational challenges to be in a better position to sustain competitive advantage. Hence, DCs are important for business firms to sustain their competitive advantage regardless whether the firms operate in low or high dynamic business environments.

Central to the survival and prosperity of firms under uncertain business environment, business firms also face the opportunities as well as threats incurred by growing domestic and global competition, well-informed customers, higher expectations and rapid technological advances (Eidizadeh, Salehzadeh, & Chitsaz Esfahani, 2017). Concerning these challenges, the PED does not act as a moderator (Li & Liu, 2014). Instead, the dynamism of the environment acts more as a driver for the Malaysian E&E manufacturing firms to sustain their competitive advantage (Dickson & Weaver, 1997; Helfat et al., 2007; Li & Liu, 2014). As a result, Malaysian E&E manufacturing firms should be harnessing their KM, MI and DCs in low or dynamic environments to enhance their SCA.

5.4 Implications of the Research

The research implications of this study have two folds and they are recognised as theoretical (empirical) contributions and practical contributions.

5.4.1 Theoretical Contribution

This study has research implications in the fields of RBT. Generally, the findings in this study contribute to the literature of Malaysian E&E manufacturing firms by examining the impact of KM, MI and DCs on firms' ability to sustain their competitive advantage under dynamic business environment. Several specific theoretical contributions are as per discussed below.

The first theoretical contribution of this study is the empirical effort to develop a new paradigm for conceptualising SCA (Summers, 2001). The implication of this contribution is two-folds. Firstly, it offers a new and holistic perspective to examine the concept of SCA. Secondly, it contributes to an alternative measurement to operationalise SCA. To be specific, the contribution of this study is pertinent to the enhancement of RBT by integrating RBT and stakeholder theory in the examination of SCA that provides a better grasp of how business firms can stay competitive over time.

As one of the most widely accepted theories in strategy management, the RBT proposes that a firm's resources underlie its ability to achieve SCA. However, much of the extant work in this stream that employs RBT has been overpopulated with the economic perspective when measuring the performance outcome (Newbert, 2007) while the other perspectives other than economic perspective have received little attention.

This gap may represent an opportunity for new research to be conducted. The stakeholder theory and the concepts of sustainability are being brought in to measure SCA in this study. Along with this view, this study proposed to measure SCA as a multidimensional construct, by incorporating economic performance, environmental performance and social performance as an alternative choice to examine firms' SCA. In so-doing, this research can offer a more distinct conceptualisation of the SCA which has been largely ignored in the previous studies.

The second theoretical contribution is pertinent to the theoretical insights through the nascent examinations of the relationships between the impact of multiple firm-level capabilities (i.e., KM, MI and DCs) and the newly proposed SCA measurement. "Testing the theoretical linkage between two constructs that has not previously been tested" (p. 408) is a viable theoretical contribution (Summers, 2001). While this theoretical notion applies, three nascent relationships had been examined in this study. They were: i) the relationship between KM and SCA, ii) the relationship between DCs and SCA, and finally iii) the relationship between MI and SCA. Besides, this study also contributes to the literature on interactive effects among multiple firm capabilities on SCA.

The last theoretical contribution of this study comes amid the empirical effort to examine the effects of a potential moderator variable on the nature of the relationship between two constructs (Summers, 2001). PED was used to test the moderating effect between the predictors and the newly proposed SCA measurement. However, the results showed that PED did not demonstrate significant moderating effects on the relationships as mentioned in the second theoretical contribution. A probable reasons is E&E manufacturing firms span across four different sub-sectors (i.e., consumer electronics, electronic components,

industrial electronics, and electrical) and the level of dynamism of each subsectors varies. Whilst from the statistical point of view, a probable reason for the absence of moderation is because of the low variance of answers pertaining to question asked on PED.

In sum, the findings in this study are assumed to contribute to the body of knowledge by `extending pieces of literature about the RBT and the operationalisation of SCA through the lens of stakeholder theory and the concepts of sustainability. Specifically, this study is hopeful to shed lights on the operationalisation of SCA in the Malaysian E&E manufacturing firms and the impact of KM, MI and DCs under PED on firm's ability to sustain their competitive advantage.

5.4.2 Practical Contribution

The findings of this study address the managerial implications for the Malaysian E&E manufacturing firms. In the practical sense, the findings in this study are assumed to contribute E&E manufacturing industry to sustain its competitive advantage in a turbulent environment over the competitors in the long run. As an emerging economy, it is imperative for the Malaysian E&E manufacturing firms to achieve SCA and increase its competitiveness over the competitors in the regional and global markets. Besides, the findings of this study indicate that the E&E manufacturers in Malaysia should not only focus on economic performance but environmental performance and social performance too. This provides a more comprehensive insight for the firms to sustain their competitive advantage over their competitors in the long run.

Particular to the E&E manufacturers in Malaysia, the findings of this study provide practical guidance to the E&E manufacturers in Malaysia as to what to do in order to

sustain their competitive advantage over their competitors in the regional and global markets. In other words, this study can help E&E manufacturing firms understand their resources or capabilities that can generate SCAs. For instance, this study indicates that the Malaysian E&E manufacturing firms should pay more attention to manage knowledge and develop DCs to sustain their competitive advantage over competitors. Failure of the Malaysian E&E manufacturing firms to come out a clear plan and strategy for managing knowledge and developing DCs will threaten their survival in the face of global competition.

As to the government and policymakers, the Malaysian government should not neglect the importance of the E&E manufacturing industry contribution to the Malaysian economy. Given that the current global economic scenario, as well as increasing global competition, government can play their roles by providing the assistance and support to the E&E manufacturers in attaining the SCA. For example, the government can provide incentive and technical assistance for E&E manufacturing firms to embark high-value manufacturing activities. Hence, this study is expected to contribute Malaysian government to strategies the policy in order to overcome difficulties and more importantly in ensuring the sustainability and competitiveness of the Malaysian E&E manufacturing industry, in order to become a truly developed economy.

5.5 Limitation and Direction of Future Study

Despite this research presented evidence regarding the impacts of predictors on SCA, the results should be interpreted in light of the study's limitations that grant opportunities for future research. First, the scope of this study mainly focused on Malaysian E&E manufacturing firms from the manufacturing sector. Given the importance of

manufacturing sector in the economic development in Malaysia, future research should also be conducted in other manufacturing sectors (e.g., chemicals and machinery & equipment) in order to have a complete picture. Apart from this, the sample frame was the E&E manufacturing firms, which indicates that the result of this study cannot be generalised to other industries. Therefore, caution is recommended when generalising the findings of this study to other industries operating in Malaysian business environments.

Second, this study is a cross-sectional study and was carried out at one point in time. The datasets used in this study were collected in a cross-sectional nature and this short period of study may not capture processes very well. Future research may consider longitudinal study because it offers advantages of tracking changes over time (Cooper & Schindler, 2014). Therefore, it renders better capture for the constructs understudied. In this respect, Wiggins and Ruefli (2002), for instance, stress the significance of a longitudinal dataset to evaluate the impact of resources and capabilities on SCA reliably. This is particularly important, as RBT have argued that VRIN resources and capabilities should possess a sustaining effect on competitive advantage (e.g., Barney, 1991).

Third, the field approach used in this study relied on the questionnaire delivered via email to reach the targeted population (i.e., Malaysian E&E manufacturing firms) located in wide geographic regions in Malaysia. While email survey was able to ensure better coverage of the Malaysian E&E manufacturing firms, however, this method is not able to ensure the respondents understood the questions fully. Hence, it is recommended that future research should employ a mixed method that explores the study from both qualitative and quantitative perspectives. For instance, face-to-face personal interviews

with semi-structured or unstructured questions should be carried out to get the information.

Finally, this study relied upon the respondents' perceptions of environmental dynamism that may lead to differences between the perceptual and actual levels of dynamism. Hence, investigating the differences between both levels of dynamism (i.e., perceptual and actual levels of dynamism) may extend the understanding of SCA. This is because capturing the variance between both levels of dynamism might affect the resources and capabilities deployment as well as the SCA in the business world.

5.6 Summary of Chapter

This chapter discusses the research findings and the implications of these findings. The discussions of the findings are organised according to the flow of the four research objectives and highlighted with the comparisons of the current findings with those of the past, and hence the contribution to the body of knowledge. This chapter further discusses both theoretical and practical contributions of the study. Towards the end, methodological limitations and potential future research avenues were also depicted.

REFERENCE

Abdillah, N. (2014). Historical Institutionalism and Economic Diversification: The Case of Malaysia. *Asian Social Science*, *10*(9), 40–51.

Abdullah, N. L., Jamaludin, K. R., & Talib, H. H. A. (2013). Insights from Data Collection in Malaysia's Electrical & Electronics Manufacturing Industry.

Abrahamson, E. (1996). Management Fashion. *Academy of Management Review*, *21*(1), 254–285. https://doi.org/10.5465/AMR.1996.9602161572

Aguinis, H., & Glavas, A. (2012). What We Know and Don't Know About Corporate Social Responsibility: A Review and Research Agenda. *Journal of Management*, *38*(4), 932–968. https://doi.org/10.1177/0149206311436079

Aguinis, H., Gottfredson, R. K., & Joo, H. (2013). Best-Practice Recommendations for Defining, Identifying, and Handling Outliers. *Organizational Research Methods*, *16*(2), 270–301. https://doi.org/10.1177/1094428112470848

Ahmad, A. (2015). Business Intelligence for Sustainable Competitive Advantage. In M. Quaddus & A. G. Woodside (Eds.), *Sustaining Competitive Advantage Via Business Intelligence, Knowledge Management, and System Dynamics* (pp. 3–220). Emerald Group Publishing Limited. https://doi.org/10.1108/S1069-0964201522B

Alaarj, S., Abidin-Mohamed, Z., & Bustamam, U. S. B. A. (2016). Mediating Role of Trust on the Effects of Knowledge Management Capabilities on Organizational Performance. *Procedia - Social and Behavioral Sciences*, *235*, 729–738. https://doi.org/10.1016/J.SBSPRO.2016.11.074

Alavi, M., & Leidner, D. (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, *25*(1), 107–136. https://doi.org/10.2307/3250961

Alavi, R. (1996). *Industrialization in Malaysia: Import Substitution and Infant Industry Performance*. London: Routledge.

Ambrosini, V., & Bowman, C. (2009). What are dynamic capabilities and are they a useful construct in strategic management? *International Journal of Management Reviews*, *11*(1), 29–49. https://doi.org/10.1111/j.1468-2370.2008.00251.x

Aminu, M. I., & Mahmood, R. (2015). Mediating Role of Dynamic Capabilities on the Relationship between Intellectual Capital and Performance: A Hierarchical Component Model Perspective in PLS-SEM Path Modeling. *Research Journal of Business Management*, *9*(3), 443–456. https://doi.org/10.3923/rjbm.2015.443.456

Amit, R., & Schoemaker, P. J. H. (1993). Strategic Assets and Organizational Rent. *Strategic Management Journal*, *14*, 33–46. https://doi.org/10.1002/smj.4250140105

Andreeva, T., & Kianto, A. (2011). Knowledge processes, knowledge- intensity and innovation: a moderated mediation analysis. *Journal of Knowledge Management*, *15*(6), 1016–1034. https://doi.org/10.1108/13673271111179343

Andreeva, T., & Kianto, A. (2012). Does knowledge management really matter? Linking knowledge management practices, competitiveness and economic performance. *Journal of Knowledge Management*, *16*(4), 617–636.

Andrews, K. R. (1971). *The Concept of Corporate Strategy*. Homewood, IL: Dow Jones-

Irwin.

Andrews, R., & Johansen, M. (2012). Organizational Environments and Performance: A Linear or Nonlinear Relationship? *Public Organization Review*, *12*(2), 175–189. https://doi.org/10.1007/s11115-012-0173-z

Arend, R. J., & Bromiley, P. (2009). Assessing the dynamic capabilities view: spare change, everyone? *Strategic Organization*, *7*(1), 75–90. https://doi.org/10.1177/1476127008100132

Ariff, M., & Abubakar, S. Y. (1999). The Malaysian Financial Crisis: Economic Impact and Recovery Prospects. *The Developing Economies*, *37*(4), 417–438. https://doi.org/10.1111/j.1746-1049.1999.tb00241.x

Armbruster, H., Bikfalvi, A., Kinkel, S., & Lay, G. (2008). Organizational innovation: The challenge of measuring non-technical innovation in large-scale surveys. *Technovation*, *28*(10), 644–657. https://doi.org/10.1016/j.technovation.2008.03.003

Armstrong, C. E., & Shimizu, K. (2007). A Review of Approaches to Empirical Research on the Resource-Based View of the Firm . *Journal of Management*, *33*(6), 959–986. https://doi.org/10.1177/0149206307307645

Ashby, A., Leat, M., & Hudson- Smith, M. (2012). Making connections: a review of supply chain management and sustainability literature. *Supply Chain Management: An International Journal*, *17*(5), 497–516. https://doi.org/10.1108/13598541211258573

Asrar-ul-Haq, M., Anwar, S., & Nisar, T. (2016). A systematic review of knowledge

management and knowledge sharing: Trends, issues, and challenges. *Cogent Business & Management*, *3*, 1–17. https://doi.org/10.1080/23311975.2015.1127744

Atalay, M., Anafarta, N., & Sarvan, F. (2013). The Relationship between Innovation and Firm Performance: An Empirical Evidence from Turkish Automotive Supplier Industry. *Procedia - Social and Behavioral Sciences*, *75*, 226–235. https://doi.org/10.1016/J.SBSPRO.2013.04.026

Augier, M., & Teece, D. J. (2008). Strategy as Evolution with Design: The Foundations of Dynamic Capabilities and the Role of Managers in the Economic System. *Organization Studies*, *29*(8–9), 1187–1208. https://doi.org/10.1177/0170840608094776

Azar, G., & Ciabuschi, F. (2017). Organizational innovation, technological innovation, and export performance: The effects of innovation radicalness and extensiveness. *International Business Review*, *26*(2), 324–336. https://doi.org/10.1016/J.IBUSREV.2016.09.002

Babakus, E., & Mangold, W. G. (1992). Adapting the SERVQUAL scale to hospital services: an empirical investigation. *Health Services Research*, *26*(6), 767–786.

Babbie, E. R. (2014). *The Basics of Social Research* (6th ed.). New York: Wadsworth Cengage Learning.

Bank Negara. (2011). *Economic Developments in 2011*. Kuala Lumpur.

Bank Negara Malaysia. (2017). *Bank Negara Malaysia Annual Report 2016*. Malaysia.

Bank Negara Malaysia. (2018). *Bank Negara Malaysia Annual Report 2017*. Malaysia.

Bansal, P., & DesJardine, M. R. (2014). Business sustainability: It is about time. *Strategic Organization*, *12*(1), 70–78. https://doi.org/10.1177/1476127013520265

Barley, W. C., Treem, J. W., & Kuhn, T. (2018). Valuing Multiple Trajectories of Knowledge: A Critical Review and Agenda for Knowledge Management Research. *Academy of Management Annals*, *12*(1), 278–317. https://doi.org/10.5465/annals.2016.0041

Barney, J. B. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, *17*(1), 99–120.

Barney, J. B. (1995). Looking inside for competitive advantage. *Academy of Management Executive*, *9*(4), 49–61. https://doi.org/10.5465/AME.1995.9512032192

Barney, J. B. (2001a). Is the Resource-Based "View" a Useful Perspective for Strategic Management Research? Yes. *The Academy of Management Review*, *26*(1), 41–56. https://doi.org/10.2307/259393

Barney, J. B. (2001b). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *Journal of Management*, *27*(6), 643–650. https://doi.org/10.1177/014920630102700602

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, *51*(6), 1173–1182. https://doi.org/10.1037/0022-3514.51.6.1173

Barreto, I. (2010). Dynamic Capabilities: A Review of Past Research and an Agenda for

the Future. *Journal of Management*, *36*(1), 256–280. https://doi.org/10.1177/0149206309350776

Bartol, K. M., & Srivastava, A. (2002). Encouraging Knowledge Sharing: The Role of Organizational Reward Systems. *Journal of Leadership & Organizational Studies*, *9*(1), 64–76. https://doi.org/10.1177/107179190200900105

Basile, A., & Faraci, R. (2015). Aligning management model and business model in the management innovation perspective. *Journal of Organizational Change Management*, *28*(1), 43–58. https://doi.org/10.1108/JOCM-10-2013-0199

Battagello, F. M., Cricelli, L., & Grimaldi, M. (2016). Benchmarking strategic resources and business performance via an open framework. *International Journal of Productivity and Performance Management*, *65*(3), 324–350.

Baum, J. R., & Wally, S. (2003). Strategic decision speed and firm performance. *Strategic Management Journal*, *24*(11), 1107–1129. https://doi.org/10.1002/smj.343

Becker, J. M., Klein, K., & Wetzels, M. (2012). Hierarchical Latent Variable Models in PLS-SEM: Guidelines for Using Reflective-Formative Type Models. *Long Range Planning*, *45*(5–6), 359–394. https://doi.org/10.1016/J.LRP.2012.10.001

Beckman, T. J. (1999). The current state of knowledge management. In J. Liebowitz (Ed.), *Knowledge Management Handbook* (p. 1.11-1.22). Florida: CRC Press.

Bharati, P., Zhang, W., & Chaudhury, A. (2015). Better knowledge with social media? Exploring the roles of social capital and organizational knowledge management. *Journal of Knowledge Management*, *19*(3), 456–475. https://doi.org/10.1108/JKM-

11-2014-0467

Bhatt, G. D. (2001). Knowledge management in organizations: examining the interaction between technologies, techniques, and people. *Journal of Knowledge Management*, *5*(1), 68–75. https://doi.org/10.1108/13673270110384419

Birkinshaw, J. M., Hamel, G., & Mol, M. J. (2008). Management innovation. *Academy of Management Review*, *33*(4), 825–845. https://doi.org/10.5465/AMR.2008.34421969

Bollinger, A. S., & Smith, R. D. (2001). Managing organizational knowledge as a strategic asset. *Journal of Knowledge Management*, *5*(1), 8–18. https://doi.org/10.1108/13673270110384365

Bromiley, P., & Rau, D. (2015). Operations management and the resource based view: Another view. *Journal of Operations Management*, *41*, 95–106. https://doi.org/10.1016/j.jom.2015.11.003

Bryman, A., & Bell, E. (2011). *Business Research Methods* (3rd ed.). Oxford: Oxford University Press.

Camisén, C., & Villar-López, A. (2011). Non-technical innovation: Organizational memory and learning capabilities as antecedent factors with effects on sustained competitive advantage. *Industrial Marketing Management*, *40*(8), 1294–1304. https://doi.org/10.1016/j.indmarman.2011.10.001

Camisón, C., & Villar-López, A. (2014). Organizational innovation as an enabler of technological innovation capabilities and firm performance. *Journal of Business Research*, *67*(1), 2891–2902. https://doi.org/10.1016/j.jbusres.2012.06.004

Canidas, M. C. J., Gehrsitz, M. H., & Semeijn, J. (2013). Participation of suppliers in greening supply chains: An empirical analysis of German automotive suppliers. *Journal of Purchasing and Supply Management*, *19*(3), 134–143. https://doi.org/10.1016/j.pursup.2013.02.005

Cao, D., Berkeley, N., & Finlay, D. (2014). Measuring sustained competitive advantage from resource-based view: survey of Chinese clothing industry. *Journal of Sustainable Development*, *7*(2), 89–104. https://doi.org/10.5539/jsd.v7n2p89

Caves, R. E., & Porter, M. E. (1977). From Entry Barriers to Mobility Barriers: Conjectural Decisions and Contrived Deterrence to New Competition. *The Quarterly Journal of Economics*, *91*(2), 241. https://doi.org/10.2307/1885416

Cavusgil, E., Seggie, S. H., & Talay, M. B. (2007). Dynamic Capabilities View: Foundations and Research Agenda. *Journal of Marketing Theory and Practice*, *15*(2), 159–166. https://doi.org/10.2753/MTP1069-6679150205

Černe, M., Jaklič, M., & Škerlavaj, M. (2016). Management innovation enters the game: Re-considering the link between technological innovation and financial performance. *Innovation*, *17*(4), 429–449. https://doi.org/10.1080/14479338.2015.1126530

Chaharbaghi, K., & Lynch, R. (1999). Sustainable competitive advantage: towards a dynamic resource- based strategy. *Management Decision*, *37*(1), 45–50. https://doi.org/10.1108/00251749910252012

Chandran, V. G. R., Rasiah, R., & Peter, W. (2012). Malaysia's manufacturing innovation experience. In R. Rasiah, L. Yeo, & S. Yuri (Eds.), *Innovation and*

Industrialization in Asia (pp. 128–150). United Kingdom: Routledge.

Chatzoglou, P. D., Chatzoudes, D., Sarigiannidis, L., & Theriou, G. (2018). The role of firm-specific factors in the strategy-performance relationship: revisiting the resource-based view of the firm and the VRIO framework. *Management Research Review*, *41*(1), 46–73. https://doi.org/10.1108/MRR-10-2016-0243

Chee, P. L. (1987). Changes in the Malaysian Economy and Trade Trends and Prospects. In J. Bradford, Colin I. & W. H. Branson (Eds.), *Trade and Structural Change in Pacific Asia* (pp. 435–466). Chicago: The University of Chicago Press.

Chen, H., Zeng, S., Lin, H., & Ma, H. (2017). Munificence, Dynamism, and Complexity: How Industry Context Drives Corporate Sustainability. *Business Strategy and the Environment*, *26*(2), 125–141. https://doi.org/10.1002/bse.1902

Chen, L. (2015). *Sustainability and company performance: Evidence from the manufacturing industry*. Linköping University.

Child, J. (1972). Organizational Structure, Environment and Performance: The Role of Strategic Choice. *Sociology*, *6*(1), 1–22. https://doi.org/10.1177/003803857200600101

Chuang, S.-H. (2004). A resource-based perspective on knowledge management capability and competitive advantage: an empirical investigation. *Expert Systems with Applications*, *27*(3), 459–465. https://doi.org/10.1016/j.eswa.2004.05.008

Clarke, R., Driffiel, N., & Halim, M. N. (2003). *Inward Foreign Direct Investment and the Industrial Development of Malaysia* (No. 2003/004). Lancaster. Retrieved from

http://eprints.lancs.ac.uk/48555/1/Document.pdf

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Comin, D. (2014). *Malaysia Beyond 2020*. Johor Bahru: UTM Press.

Cooper, D., & Schindler, P. S. (2014). *Business research methods (12th ed.)*. New York, NY: McGraw-Hill Irwin.

Coyne, K. P. (1986). Sustainable Competitive Advantage -What It Is, What It Isn't. *Business Horizons*, *29*(1), 54–61.

Creswell, J. W. (2014). *Research Design. Qualitative, Quantitative, and Mixed Methods Approaches.* (4th ed.). Thousand Oaks: Sage Publications. https://doi.org/10.1016/j.math.2010.09.003

Crossan, M. M., & Apaydin, M. (2010). A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature. *Journal of Management Studies*, *47*(6), 1154–1191. https://doi.org/10.1111/j.1467-6486.2009.00880.x

Cui, Y., & Jiao, H. (2011). Dynamic capabilities, strategic stakeholder alliances and sustainable competitive advantage: evidence from China. *Corporate Governance: The International Journal of Business in Society*, *11*(4), 386–398. https://doi.org/10.1108/14720701111159235

D'Aveni, R. A., Dagnino, G. B., & Smith, K. G. (2010). The age of temporary advantage. *Strategic Management Journal*, *31*(13), 1371–1385. https://doi.org/10.1002/smj.897

Daft, R. L., Sormunen, J., & Parks, D. (1988). Chief executive scanning, environmental characteristics, and company performance: An empirical study. *Strategic Management Journal*, *9*(2), 123–139. https://doi.org/10.1002/smj.4250090204

Dalkir, K. (2011). *Knowledge Management in Theory and Practice: Second Edition*. Cambridge: The MIT Press.

Damanpour, F. (2010). An Integration of Research Findings of Effects of Firm Size and Market Competition on Product and Process Innovations. *British Journal of Management*, *21*(4), 996–1010. https://doi.org/10.1111/j.1467-8551.2009.00628.x

Damanpour, F. (2014). Footnotes to Research on Management Innovation. *Organization Studies*, *35*(9), 1265–1285. https://doi.org/10.1177/0170840614539312

Damanpour, F., & Aravind, D. (2012). Managerial Innovation: Conceptions, Processes, and Antecedents. *Management and Organization Review*, *8*(2), 423–454. https://doi.org/10.1111/j.1740-8784.2011.00233.x

Damanpour, F., & Evan, W. M. (1984). Organizational Innovation and Performance: The Problem of "Organizational Lag." *Administrative Science Quarterly*, *29*(3), 392–409. https://doi.org/10.2307/2393031

Damanpour, F., & Schneider, M. (2006). Phases of the Adoption of Innovation in Organizations: Effects of Environment, Organization and Top Managers. *British Journal of Management*, *17*(3), 215–236. https://doi.org/10.1111/j.1467-8551.2006.00498.x

Darroch, J. (2003). Developing a measure of knowledge management behaviors and

practices. *Journal of Knowledge Management*, *7*(5), 41–54. https://doi.org/10.1108/13673270310505377

Davenport, T. H., & Prusak, L. (2000). *Working Knowledge: How Organizations Manage What They Know*. Boston ,MA: Harvard Business Press.

Denford, J. S., & Chan, Y. E. (2011). Knowledge strategy typologies: defining dimensions and relationships. *Knowledge Management Research & Practice*, *9*(2), 102–119. https://doi.org/10.1057/kmrp.2011.7

Denrell, J., Fang, C., & Zhao, Z. (2013). Inferring superior capabilities from sustained superior performance: A Bayesian analysis. *Strategic Management Journal*, *34*(2), 182–196. https://doi.org/10.1002/smj.2001

Dess, G. G., & Beard, D. W. (1984). Dimensions of Organizational Task Environments. *Administrative Science Quarterly*, *29*(1), 52–73. https://doi.org/10.2307/2393080

Devadason, E. S. (2011). Product Quality Changes and the Demand for Skills: Evidence from Malaysia's Trade in Manufactures. *Malaysian Journal of Economic Studies*, *48*(1), 1–21.

Devadason, E. S. (2019). Malaysia: Trade, Foreign Direct Investment and Regional Integration. In *Southeast Asia and the ASEAN Economic Community. Potential and Opportunities*. United Kingdom: Palgrave Macmillan.

Diamantopoulos, A., Sarstedt, M., Fuchs, C., Wilczynski, P., & Kaiser, S. (2012). Guidelines for choosing between multi-item and single-item scales for construct measurement: a predictive validity perspective. *Journal of the Academy of*

Marketing Science, *40*(3), 434–449. https://doi.org/10.1007/s11747-011-0300-3

Diamantopoulos, A., & Winklhofer, H. M. (2001). Index Construction with Formative Indicators: An Alternative to Scale Development. *Journal of Marketing Research*, *38*(2), 269–277. https://doi.org/10.2307/1558630

Di Stefano, G., Peteraf, M., & Verona, G. (2010). Dynamic capabilities deconstructed : a bibliographic investigation into the origins, development, and future directions of the research domain. *Industrial and Corporate Change*, *19*(4), 1187–1204. https://doi.org/10.1093/icc/dtq027

Di Stefano, G., Peteraf, M., & Verona, G. (2014). The Organizational Drivetrain: A Road To Integration of Dynamic Capabilities Research. *Academy of Management Perspectives*, *28*(4), 307–327. https://doi.org/10.5465/amp.2013.0100

Dickson, P. H., & Weaver, K. M. (1997). Environmental Determinants and Individual-Level Moderators of Alliance Use. *The Academy of Management Journal*, *40*(2), 404–425. https://doi.org/10.2307/256888

Dillman, D. A., Smyth, J. D., & Christian, L. M. (2014). Internet, Phone, Mail, and Mixed-Mode Surveys: The Tailored Design Method.

Dixon, S. E. A., Meyer, K. E., & Day, M. (2010). Stages of Organizational Transformation in Transition Economies: A Dynamic Capabilities Approach. *Journal of Management Studies*, *47*(3), 416–436. https://doi.org/10.1111/j.1467-6486.2009.00856.x

Droge, C., Calantone, R., & Harmancioglu, N. (2008). New Product Success: Is It Really

Controllable by Managers in Highly Turbulent Environments? *Journal of Product Innovation Management*, *25*(3), 272–286. https://doi.org/10.1111/j.1540-5885.2008.00300.x

Dubey, A. M., Goel, G., & Sahu, G. P. (2013). Effective implementation of competitive advantage and sustainable competitive advantage: a conceptual model. *International Journal of Business Innovation and Research*, *7*(5), 519–535. https://doi.org/10.1504/IJBIR.2013.056176

Duncan, R. B. (1972). Characteristics of Organizational Environments and Perceived Environmental Uncertainty. *Administrative Science Quarterly*, *17*(3), 313–327. https://doi.org/10.2307/2392145

Easterby-Smith, M., Lyles, M. A., & Peteraf, M. A. (2009). Dynamic Capabilities: Current Debates and Future Directions. *British Journal of Management*, *20*(s1), S1–S8. https://doi.org/10.1111/j.1467-8551.2008.00609.x

Easterby-Smith, M., & Prieto, I. M. (2008). Dynamic Capabilities and Knowledge Management: an Integrative Role for Learning? *British Journal of Management*, *19*(3), 235–249. https://doi.org/10.1111/j.1467-8551.2007.00543.x

Egbu, C. O., Hari, S., & Renukappa, S. H. (2005). Knowledge management for sustainable competitiveness in small and medium surveying practices. *Structural Survey*, *23*(1), 7–21. https://doi.org/10.1108/02630800510586871

Eidizadeh, R., Salehzadeh, R., & Chitsaz Esfahani, A. (2017). Analysing the role of business intelligence, knowledge sharing and organisational innovation on gaining

competitive advantage. *Journal of Workplace Learning*, *29*(4), 250–267. https://doi.org/10.1108/JWL-07-2016-0070

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic capabilities: what are they? *Strategic Management Journal*, *21*(10–11), 1105–1121. https://doi.org/10.1002/1097-0266(200010/11)21:10/11<1105::AID-SMJ133>3.0.CO;2-E

El Shafeey, T., & Trott, P. (2014). Resource-based competition: three schools of thought and thirteen criticisms. *European Business Review*, *26*(2), 122–148. https://doi.org/10.1108/EBR-07-2013-0096

Eltayeb, T. K., Zailani, S., & Ramayah, T. (2011). Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: Investigating the outcomes. *Resources, Conservation and Recycling*, *55*(5), 495–506. https://doi.org/10.1016/j.resconrec.2010.09.003

EPU. (2014). *Complexity Analysis Study of Malaysia's Manufacturing Industries*. Putrajaya.

EPU. (2015). *Eleventh Malaysia Plan, 2016-2020: Anchoring Growth on People*.

Eroglu, C., & Hofer, C. (2014). The effect of environmental dynamism on returns to inventory leanness. *Journal of Operations Management*, *32*(6), 347–356. https://doi.org/10.1016/J.JOM.2014.06.006

Erwee, R., Skadiang, B., & Roxas, B. (2012). Knowledge management culture, strategy and process in Malaysian firms. *Knowledge Management Research & Practice*, *10*(1), 89–98. https://doi.org/10.1057/kmrp.2011.37

Fagerberg, J., Martin, B. R., & Andersen, E. S. (2013). *Innovation Studies: Evolution and Future Challenges*. Oxford: Oxford University Press.

Fahy, J. (2000). The resource-based view of the firm: Some stumbling block on the road to understanding sustainable competitive advantage. *Journal of European Industrial Training*, *24*(2/3/4), 94–104. https://doi.org/10.1108/03090590010321061

Fainshmidt, S., Pezeshkan, A., Lance Frazier, M., Nair, A., & Markowski, E. (2016). Dynamic Capabilities and Organizational Performance: A Meta-Analytic Evaluation and Extension. *Journal of Management Studies*, *53*(8), 1348–1380. https://doi.org/10.1111/joms.12213

Fassott, G., & Henseler, J. (2015). Formative (Measurement). In *Wiley Encyclopedia of Management* (pp. 1–4). Chichester, UK: John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118785317.weom090113

Fassott, G., Henseler, J., & Coelho, P. S. (2016). Testing moderating effects in PLS path models with composite variables. *Industrial Management & Data Systems*, *116*(9), 1887–1900. https://doi.org/10.1108/IMDS-06-2016-0248

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191. https://doi.org/10.3758/BF03193146

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2014). G*Power.

Fernandes Rodrigues Alves, M., Vasconcelos Ribeiro Galina, S., & Dobelin, S. (2018).

Literature on organizational innovation: past and future. *Innovation & Management Review*, *15*(1), 2–19. https://doi.org/10.1108/INMR-01-2018-001

FMM. (2016). *FMM Directory of Malaysian Industries 2016*. Kuala Lumpur.

Frank, H., Güttel, W., & Kessler, A. (2017). Environmental dynamism, hostility, and dynamic capabilities in medium-sized enterprises. *The International Journal of Entrepreneurship and Innovation*, *18*(3), 185–194. https://doi.org/10.1177/1465750317723219

Freeman, R. E. (1984). *Strategic Management: A Stakeholder Approach* (Vol. 1). Boston: Pitman Publishing. https://doi.org/10.2139/ssrn.263511

Ganter, A., & Hecker, A. (2014). Configurational paths to organizational innovation: Qualitative comparative analyses of antecedents and contingencies. *Journal of Business Research*, *67*(6), 1285–1292. https://doi.org/10.1016/j.jbusres.2013.03.004

Gao, T., Chai, Y., & Liu, Y. (2017). A Review of Knowledge Management and Future Research Trend. In *Proceedings of the 2nd International Conference on Crowd Science and Engineering* (pp. 82–92). Beijing, China. https://doi.org/10.1145/3126973.3126997

García-Castro, R., & Ariño, M. A. (2011). The Multidimensional Nature of Sustained Competitive Advantage: Test at a United States Airline. *International Journal of Management*, *28*(1), 230–248.

García-Zamora, E., González-Benito, Ó., & Muñoz-Gallego, P. A. (2013). Organizational and environmental factors as moderators of the relationship between

multidimensional innovation and performance. *Innovation*, *15*(2), 224–244. https://doi.org/10.5172/impp.2013.15.2.224

Garrido-Moreno, A., Lockett, N., & Garcia-Morales, V. (2015). Exploring the role of knowledge management practices in fostering customer relationship management as a catalyst of marketing innovation. *Baltic Journal of Management*, *10*(4), 393–412. https://doi.org/10.1108/BJM-10-2014-0166

Garson, G. D. (2012). *Testing Statistical Assumptions*. Statistical Associates Publishing. Retrieved from http://www.statisticalassociates.com/assumptions.pdf

Giudici, A., & Reinmoeller, P. (2012). Dynamic capabilities in the dock: A case of reification? *Strategic Organization*, *10*(4), 436–449. https://doi.org/10.1177/1476127012457977

Glavas, A., & Mish, J. (2015). Resources and Capabilities of Triple Bottom Line Firms: Going Over Old or Breaking New Ground? *Journal of Business Ethics*, *127*(3), 623–642. https://doi.org/10.1007/s10551-014-2067-1

Gliem, J. A., & Gliem, R. R. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. In *Midwest Research to Practice Conference in Adult, Continuing, and Community Education* (pp. 82–88). https://doi.org/10.1109/PROC.1975.9792

Goel, A., Rana, G., & Rastogi, R. (2010). Knowledge Management as a Process to Develop Sustainable Competitive Advantage. *South Asian Journal of Management*, *17*(3), 104–116.

Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge Management: An Organizational Capabilities Perspective. *Journal of Management Information Systems*, *18*(1), 185–214. https://doi.org/10.1080/07421222.2001.11045669

Gomez, E. T., & Sundaram, J. K. (1999). *Malaysia's Political Economy: Politics, Patronage and Profits* (2nd ed.). Cambridge: Cambridge University Press.

Grant, R. M. (1996). Toward a knowledge-based theory of the firm. *Strategic Management Journal*, *17*(Winter Special Issue), 109–122. https://doi.org/10.2307/2486994

Gualandris, J., & Kalchschmidt, M. (2016). Developing environmental and social performance: the role of suppliers' sustainability and buyer–supplier trust. *International Journal of Production Research*, *54*(8), 2470–2486. https://doi.org/10.1080/00207543.2015.1106018

Gualandris, J., Klassen, R. D., Vachon, S., & Kalchschmidt, M. (2015). Sustainable evaluation and verification in supply chains: Aligning and leveraging accountability to stakeholders. *Journal of Operations Management*, *38*, 1–13. https://doi.org/10.1016/j.jom.2015.06.002

Guo, C. (2007). Is Sustainable Competitive Advantage an Achievable Holy Grail: The Relevance Gap between Academia and Business. *Journal of Business & Management*, *13*(2), 115–126.

Hair, J. F., J., Sarstedt, M., Hopkins, L., & Kuppelwieser, G. V. (2014). Partial least squares structural equation modeling (PLS-SEM). *European Business Review*, *26*(2),

106–121. https://doi.org/10.1108/EBR-10-2013-0128

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate Data Analysis* (7th ed.). New Jersey: Pearson Education.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2014). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. Thousand Oaks: Sage.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)* (2nd ed.). Thousand Oaks: Sage.

Hair, J. F., Pieper, T. M., & Ringle, C. M. (2012). The Use of Partial Least Squares Structural Equation Modeling in Strategic Management Research: A Review of Past Practices and Recommendations for Future Applications. *Long Range Planning*, *45*(5), 320–340. https://doi.org/10.1016/j.lrp.2012.09.008

Halbesleben, J. R. B., & Whitman, M. V. (2013). Evaluating Survey Quality in Health Services Research: A Decision Framework for Assessing Nonresponse Bias. *Health Services Research*, *48*(3), 913–930. https://doi.org/10.1111/1475-6773.12002

Hamel, G. (2006). The why, what, and how of management innovation. *Harvard Business Review*, *84*(2), 72.

Hanim Mohamad Zailani, S., Eltayeb, T. K., Hsu, C., & Choon Tan, K. (2012). The impact of external institutional drivers and internal strategy on environmental performance. *International Journal of Operations & Production Management*, *32*(6), 721–745. https://doi.org/10.1108/01443571211230943

Hart, S. L. (1995). A Natural-Resource-Based View of the Firm. *Academy of Management Review*, *20*(4), 986–1014. https://doi.org/10.5465/AMR.1995.9512280033

Hecker, A., & Ganter, A. (2013). The Influence of Product Market Competition on Technological and Management Innovation: Firm-Level Evidence from a Large-Scale Survey. *European Management Review*, *10*(1), 17–33. https://doi.org/10.1111/emre.12005

Hecker, A., & Ganter, A. (2016). Organisational and Technological Innovation and the Moderating Effect of Open Innovation Strategies. *International Journal of Innovation Management*, *20*(2), 1–31. https://doi.org/10.1142/S1363919616500195

Heisig, P. (2009). Harmonisation of knowledge management – comparing 160 KM frameworks around the globe. *Journal of Knowledge Management*, *13*(4), 4–31. https://doi.org/10.1108/13673270910971798

Heisig, P. (2015). Future Research in Knowledge Management: Results from the Global Knowledge Research Network Study. In E. Bolisani & M. Handzic (Eds.), *Advances in Knowledge Management* (pp. 151–182). Springer International Publishing. https://doi.org/10.1007/978-3-319-09501-1_7

Helfat, C. E., Finkelstein, S., Mitchell, W., Peteraf, M. a, Singh, H., Teece, D. J., & Winter, S. G. (2007). *Dynamic capabilities: Understanding strategic change in organizations*. Oxford: Blackwell Publishing.

Helfat, C. E., & Martin, J. A. (2015). Dynamic Managerial Capabilities. *Journal of*

Management, *41*(5), 1281–1312. https://doi.org/10.1177/0149206314561301

Helfat, C. E., & Peteraf, M. A. (2009). Understanding dynamic capabilities: progress along a developmental path. *Strategic Organization*, *7*(1), 91–102. https://doi.org/10.1177/1476127008100133

Helfat, C. E., & Winter, S. G. (2011). Untangling Dynamic and Operational Capabilities: Strategy for the (N)ever-Changing World. *Strategic Management Journal*, *32*(11), 1243–1250. https://doi.org/10.1002/smj.955

Henderson, A. D., Raynor, M. E., & Ahmed, M. (2012). How long must a firm be great to rule out chance? Benchmarking sustained superior performance without being fooled by randomness. *Strategic Management Journal*, *33*(4), 387–406. https://doi.org/10.1002/smj.1943

Henseler, J. (2017). Bridging Design and Behavioral Research With Variance-Based Structural Equation Modeling. *Journal of Advertising*, *46*(1), 178–192. https://doi.org/10.1080/00913367.2017.1281780

Henseler, J., & Fassott, G. (2010). Testing Moderating Effects in PLS Path Models: An Illustration of Available Procedures. In *Handbook of Partial Least Squares* (pp. 713–735). Berlin, Heidelberg: Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-540-32827-8_31

Henseler, J., Hubona, G., & Ray, P. A. (2016). Using PLS path modeling in new technology research: updated guidelines. *Industrial Management & Data Systems*, *116*(1), 2–20. https://doi.org/10.1108/IMDS-09-2015-0382

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. *Advances in International Marketing*, *20*(1), 277–319. https://doi.org/10.1016/0167-8116(92)90003-4

Hervas-Oliver, J.-L., Sempere-Ripoll, F., Boronat-Moll, C., & Rojas-Alvarado, R. (2017). On the joint effect of technological and management innovations on performance: increasing or diminishing returns? *Technology Analysis & Strategic Management*, *30*(5), 1–13. https://doi.org/10.1080/09537325.2017.1343462

Hervas-Oliver, J.-L., Sempere-Ripoll, F., Boronat-Moll, C., & Rojas, R. (2015). Technological innovation without R&D: unfolding the extra gains of management innovations on technological performance. *Technology Analysis & Strategic Management*, *27*(1), 19–38. https://doi.org/10.1080/09537325.2014.944147

Hollen, R. M. A., Van Den Bosch, F. A. J., & Volberda, H. W. (2013). The Role of Management Innovation in Enabling Technological Process Innovation: An Inter-Organizational Perspective. *European Management Review*, *10*(1), 35–50. https://doi.org/10.1111/emre.12003

Holsapple, C. W., Jones, K., & Leonard, L. N. K. (2015). Knowledge Acquisition and Its Impact on Competitiveness. *Knowledge and Process Management*, *22*(3), 157–166. https://doi.org/10.1002/kpm.1468

Hoopes, D. G., Madsen, T. L., & Walker, G. (2003). Guest editors' introduction to the special issue: why is there a resource-based view? Toward a theory of competitive heterogeneity. *Strategic Management Journal*, *24*(10), 889–902. https://doi.org/10.1002/smj.356

Hosseini, S. M. P., & Narayanan, S. (2014). Adoption, Adaptive Innovation, and Creative Innovation Among SMEs in Malaysian Manufacturing. *Asian Economic Papers*, *13*(2), 32–58. https://doi.org/10.1162/ASEP_a_00279

Hu, Y. C. (2009). Research on Relationship of Knowledge Management and Organizational Performance. In *2009 International Conference on Management of e-Commerce and e-Government* (pp. 281–283). IEEE. https://doi.org/10.1109/ICMeCG.2009.15

Hu, Y., Wen, J., & Yan, Y. (2015). Measuring the performance of knowledge resources using a value perspective: integrating BSC and ANP. *Journal of Knowledge Management*, *19*(6), 1250–1272. https://doi.org/10.1108/JKM-10-2014-0431

Huang, K.-F., Dyerson, R., Wu, L.-Y., & Harindranath, G. (2015). From Temporary Competitive Advantage to Sustainable Competitive Advantage. *British Journal of Management*, *26*(4), 617–636. https://doi.org/10.1111/1467-8551.12104

Huang, P.-Y., Wu, T.-S., Chen, L.-J., Saito, R., Yu, C.-L., Huang, C.-Y., … Tang, L. (2015). An empirical research on management innovation of high-technology manufacturers. *Advances in Mechanical Engineering*, *7*(7), 1687814015593679. https://doi.org/10.1177/1687814015593679

Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: a review of four recent studies. *Strategic Management Journal*, *20*(2), 195–204. https://doi.org/10.1002/(SICI)1097-0266(199902)20:2<195::AID-SMJ13>3.0.CO;2-7

Hung, K.-P., & Chou, C. (2013). The impact of open innovation on firm performance: The moderating effects of internal R&D and environmental turbulence. *Technovation*, *33*(10), 368–380. https://doi.org/10.1016/j.technovation.2013.06.006

Hussain, S. (2010). Knowledge management: An emerging imperative of success. *Proceedings of the European Conference on Knowledge Management, ECKM*, 471–475.

Hutchins, M. J., Robinson, S. L., & Dornfeld, D. (2013). Understanding life cycle social impacts in manufacturing: A processed-based approach. *Journal of Manufacturing Systems*, *32*(4), 536–542. https://doi.org/10.1016/j.jmsy.2013.05.008

Inkinen, H. (2016). Review of empirical research on knowledge management practices and firm performance. *Journal of Knowledge Management*, *20*(2), 230–257. https://doi.org/10.1108/JKM-09-2015-0336

Inkpen, A. C., & Dinur, A. (1998). Knowledge Management Processes and International Joint Ventures. *Organization Science*, *9*(4), 454–468. https://doi.org/10.1287/orsc.9.4.454

Ipe, M. (2003). Knowledge Sharing in Organizations: A Conceptual Framework. *Human Resource Development Review*, *2*(4), 337–359. https://doi.org/10.1177/1534484303257985

Jansen, J. J. P., Van Den Bosch, F. A. J., & Volberda, H. W. (2006). Exploratory Innovation, Exploitative Innovation, and Performance: Effects of Organizational Antecedents and Environmental Moderators. *Management Science*, *52*(11), 1661–

1674. https://doi.org/10.1287/mnsc.1060.0576

Jansen, J. J. P., Vera, D., & Crossan, M. (2009). Strategic leadership for exploration and exploitation: The moderating role of environmental dynamism. *The Leadership Quarterly*, *20*(1), 5–18. https://doi.org/10.1016/J.LEAQUA.2008.11.008

Jap, S. D. (1999). Pie-Expansion Efforts: Collaboration Processes in Buyer-Supplier Relationships. *Journal of Marketing Research*, *36*(4), 461–475. https://doi.org/10.2307/3152000

Jarvis, C. B., MacKenzie, S. B., & Podsakoff, P. M. (2003). A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research. *Journal of Consumer Research*, *30*(2), 199–218. https://doi.org/10.1086/376806

Jayasingam, S., Ansari, M. a, Ramayah, T., & Jantan, M. (2012). Knowledge management practices and performance: are they truly linked? *Knowledge Management Research & Practice*, *11*(3), 255–264. https://doi.org/10.1057/kmrp.2012.5

Jiang, W., Mavondo, F. tinoziva, & Matanda, M. J. (2015). Integrative capability for successful partnering: a critical dynamic capability. *Management Decision*, *53*(6), 1184–1202. https://doi.org/10.1108/MD-04-2014-0178

Jiao, H., Alon, I., & Cui, Y. (2011). Environmental dynamism, innovation, and dynamic capabilities: the case of China. *Journal of Enterprising Communities: People and Places in the Global Economy*, *5*(2), 131–144.

https://doi.org/10.1108/17506201111131550

Johannessen, J.-A., & Olsen, B. (2003). Knowledge management and sustainable competitive advantages: The impact of dynamic contextual training. *International Journal of Information Management*, *23*(4), 277–289. https://doi.org/10.1016/S0268-4012(03)00050-1

Jomo, K. S. (1993). Introduction. In K. S. Jomo (Ed.), *Industrialising Malaysia: Policy, Performance, Prospects* (pp. 1–13). London: Routledge.

Jomo, K. S., & Edwards, C. (1993). Malaysian Industrialisation in Historical Perspective. In K. S. Jomo (Ed.), *Industrialising Malaysia: Policy, Performance, Prospects* (pp. 14–39). London: Routledge.

Jonsson, A. (2015). Beyond knowledge management – understanding how to share knowledge through logic and practice. *Knowledge Management Research & Practice*, *13*(1), 45–58. https://doi.org/10.1057/kmrp.2013.28

Kamasak, R., Yavuz, M., & Altuntas, G. (2016). Is the relationship between innovation performance and knowledge management contingent on environmental dynamism and learning capability? Evidence from a turbulent market. *Business Research*, *9*(2), 229–253. https://doi.org/10.1007/s40685-016-0032-9

Kamasak, R., Yavuz, M., & Ozturk, T. Y. (2017). Reducing Risk Through Strategic Flexibility and Implementation Leadership in High-Velocity Markets. In *Global Business Strategies in Crisis* (pp. 273–286). Springer International Publishing. https://doi.org/10.1007/978-3-319-44591-5_19

Kaur, V., & Mehta, V. (2017). Dynamic Capabilities for Competitive Advantage. *Paradigm*, *21*(1), 31–51. https://doi.org/10.1177/0971890717701781

Keupp, M. M., Palmié, M., & Gassmann, O. (2012). The Strategic Management of Innovation: A Systematic Review and Paths for Future Research. *International Journal of Management Reviews*, *14*(4), 367–390. https://doi.org/10.1111/j.1468-2370.2011.00321.x

Khalafalla, K. Y., & Webb, A. J. (2001). Export–led growth and structural change: evidence from Malaysia. *Applied Economics*, *33*(13), 1703–1715. https://doi.org/10.1080/00036840010015066

Khoo, K. K., Yeap, J. A. L., & Ramayah, T. (2014). Knowledge Absorptive Capacity and Process Innovation: The Moderating Effect of Environmental Dynamism. *Journal of Technology Management and Business*, *1*(1). Retrieved from https://publisher.uthm.edu.my/ojs/index.php/jtmb/article/view/913

Kleindorfer, P. R., Singhal, K., & Wassenhove, L. N. (2005). Sustainable Operations Management. *Production and Operations Management*, *14*(4), 482–492. https://doi.org/10.1111/j.1937-5956.2005.tb00235.x

Koen, V., Asada, H., Nixon, S., Habeeb Rahuman, M., & Mohd Arif, A. (2017). *Malaysia's economic success story and challenges.* (OECD Economics Department Working Papers). France.

Kraaijenbrink, J., Spender, J.-C., & Groen, A. J. (2010). The Resource-Based View: A Review and Assessment of Its Critiques. *Journal of Management*, *36*(1), 349–372.

https://doi.org/10.1177/0149206309350775

Krejcie, R. V, & Morgan, D. W. (1970). Determining sample size for research activities. *Education and Psychological Measurement*, *30*, 607–610. https://doi.org/10.1177/001316447003000308

Kuo, S.-Y., Lin, P.-C., & Lu, C.-S. (2017). The effects of dynamic capabilities, service capabilities, competitive advantage, and organizational performance in container shipping. *Transportation Research Part A: Policy and Practice*, *95*, 356–371. https://doi.org/10.1016/J.TRA.2016.11.015

Laaksonen, O., & Peltoniemi, M. (2016). The Essence of Dynamic Capabilities and their Measurement. *International Journal of Management Reviews*. https://doi.org/10.1111/ijmr.12122

Lai, M.-C., Huang, H.-C., Lin, L.-H., & Kao, M.-C. (2011). Potential of organizational memory for creating service performance: A cross-level analysis. *Expert Systems with Applications*, *38*(8), 10493–10498. https://doi.org/10.1016/J.ESWA.2011.02.089

Lall, S. (1995). Malaysia: Industrial success and the role of the government. *Journal of International Development*, *7*(5), 759–773. https://doi.org/10.1002/jid.3380070506

Lam, A. (2005). Organizational innovation. In J. Fagerberg, D. C. Mowery, & R. R. Nelson (Eds.), *The Oxford handbook of innovation* (pp. 115–147). Oxford: Oxford University Press.

Laplume, A. O., Sonpar, K., & Litz, R. A. (2008). Stakeholder Theory: Reviewing a

Theory That Moves Us. *Journal of Management*, *34*(6), 1152–1189. https://doi.org/10.1177/0149206308324322

Lee, C.-Y., Wu, H.-L., & Liu, C.-Y. (2013). Contextual Determinants of Ambidextrous Learning: Evidence From Industrial Firms in Four Industrialized Countries. *IEEE Transactions on Engineering Management*, *60*(3), 529–540. https://doi.org/10.1109/TEM.2012.2228204

Lee, H., & Choi, B. (2003). Knowledge Management Enablers, Processes, and Organizational Performance: An Integrative View and Empirical Examination. *Journal of Management Information Systems*, *20*(1), 179–228. https://doi.org/10.2307/40398621

Lee, K.-W., Lanting, M. C. L., & Rojdamrongratana, M. (2016). Managing customer life cycle through knowledge management capability: a contextual role of information technology. *Total Quality Management & Business Excellence*, *28*(13–14), 1–25. https://doi.org/10.1080/14783363.2016.1150779

Lee, V.-H., Leong, L.-Y., Hew, T.-S., & Ooi, K.-B. (2013). Knowledge management: a key determinant in advancing technological innovation? *Journal of Knowledge Management*, *17*(6), 848–872. https://doi.org/10.1108/JKM-08-2013-0315

Leung, S.-O. (2011). A Comparison of Psychometric Properties and Normality in 4-, 5-, 6-, and 11-Point Likert Scales. *Journal of Social Service Research*, *37*(4), 412–421. https://doi.org/10.1080/01488376.2011.580697

Lev, B. (2017). Evaluating Sustainable Competitive Advantage. *Journal of Applied*

Corporate Finance, *29*(2), 70–75. https://doi.org/10.1111/jacf.12234

Lew, S.-L., Tan, C.-K., & Abdul Razak, S. F. (2013). The Knowledge Management Activities for Achieving Competitive Advantage: A Conceptual Framework. *International Journal of Business and Management*, *8*(23), 1–12. https://doi.org/10.5539/ijbm.v8n23p1

Li, D., & Liu, J. (2014). Dynamic capabilities, environmental dynamism, and competitive advantage: Evidence from China. *Journal of Business Research*, *67*(1), 2793–2799. https://doi.org/10.1016/j.jbusres.2012.08.007

Li, M., & Simerly, R. L. (1998). The moderating effect of environmental dynamism on the ownership and performance relationship. *Strategic Management Journal*, *19*(2), 169–179. https://doi.org/10.1002/(SICI)1097-0266(199802)19:2<169::AID-SMJ939>3.0.CO;2-2

Liang, H.-S., & Zuradi, J. (2012). Is the export-led growth hypothesis valid for Malaysia? *Journal of the Department of Statistics, Malaysia*, *2*, 1–14.

Lim, M.-H., & Goh, S.-K. (2012). *How Malaysia Weathered the Financial Crisis: Policies and Possible Lessons*. Canada: The North-South Institute.

Lin, H.-F., Su, J.-Q., & Higgins, A. (2016). How dynamic capabilities affect adoption of management innovations. *Journal of Business Research*, *69*(2), 862–876. https://doi.org/10.1016/j.jbusres.2015.07.004

Lin, Y., & Wu, L.-Y. (2014). Exploring the role of dynamic capabilities in firm performance under the resource-based view framework. *Journal of Business*

Research, *67*(3), 407–413. https://doi.org/10.1016/j.jbusres.2012.12.019

Lippman, S. A. A., & Rumelt, R. P. P. (1982). Uncertain Imitability: An Analysis of Interfirm Differences in Efficiency under Competition. *The Bell Journal of Economics*, *13*(2), 418–438. https://doi.org/10.2307/3003464

Liu, Y. (2013). Sustainable competitive advantage in turbulent business environments. *International Journal of Production Research*, *51*(10), 2821–2841. https://doi.org/10.1080/00207543.2012.720392

Liu, Y., & Liang, L. (2015). Evaluating and developing resource-based operations strategy for competitive advantage: an exploratory study of Finnish high-tech manufacturing industries. *International Journal of Production Research*, *53*(4), 1019–1037. https://doi.org/10.1080/00207543.2014.932936

Lloret, A. (2016). Modeling corporate sustainability strategy. *Journal of Business Research*, *69*(2), 418–425. https://doi.org/10.1016/j.jbusres.2015.06.047

Lockett, A., Thompson, S., & Morgenstern, U. (2009). The development of the resource-based view of the firm: A critical appraisal. *International Journal of Management Reviews*, *11*(1), 9–28. https://doi.org/10.1111/j.1468-2370.2008.00252.x

Lockett, A., & Wild, A. (2014). Bringing history (back) into the resource-based view. *Business History*, *56*(3), 372–390. https://doi.org/10.1080/00076791.2013.790371

Loke, W.-K., & Abu, N. H. (2017). Analyzing the Impact of Knowledge Management on Technological Innovation: An Empirical Study of Electrical and Electronics Industry in Malaysia. *International Journal of Academic Research in Business and*

Social Sciences, *7*(7), 640–648.

Lopes, D. P. T., Vieira, N. dos S., Barbosa, A. C. Q., & Parente, C. (2017). Management innovation and social innovation: convergences and divergences. *Academia Revista Latinoamericana de Administración*, *30*(4), 474–489. https://doi.org/10.1108/ARLA-05-2016-0150

Low, S. F., & Nair, P. B. (2010). Revisiting the Concept of Sustainable Competitive Advantage: Perceptions of Managers in Malaysian MNCs. *International Journal of Business & Accountancy*, *1*(1), 63–78.

Lubit, R. (2001). The keys to sustainable competitive advantage: Tacit knowledge and knowledge management. *Organizational Dynamics*, *29*(3), 164–178. https://doi.org/10.1016/S0090-2616(01)00026-2

Lumpkin, G. T., & Dess, G. G. (2001). Linking two dimensions of entrepreneurial orientation to firm performance: The moderating role of environment and industry life cycle. *Journal of Business Venturing*, *16*(5), 429–451. https://doi.org/10.1016/S0883-9026(00)00048-3

Lysonski, S. (1985). A Boundary Theory Investigation of the Product Manager's Role. *Journal of Marketing*, *49*(1), 26–40. https://doi.org/10.2307/1251173

Ma, H. (2000). Competitive Advantage and Firm Performance. *Competitiveness Review*, *10*(2), 15–32. https://doi.org/10.1108/eb046396

MacKenzie, S. B., Podsakoff, P. M., & Jarvis, C. B. (2005). The Problem of Measurement Model Misspecification in Behavioral and Organizational Research

and Some Recommended Solutions. *Journal of Applied Psychology*, *90*(4), 710–730. https://doi.org/10.1037/0021-9010.90.4.710

Magnier-Watanabe, R., & Benton, C. (2017). Management innovation and firm performance: the mediating effects of tacit and explicit knowledge. *Knowledge Management Research & Practice*, *15*(3), 325–335. https://doi.org/10.1057/s41275-017-0058-6

Mahani, Z. A. (2002). *Malaysia's Past and Present Economic Priorities*.

Mahani, Z. A., & Rasiah, R. (2009). *The Global Financial Crisis and the Malaysian Economy: Impact and Responses*. Kuala Lumpur.

Mahdi, O. R., Nassar, I. A., & Almsafir, M. K. (2018). Knowledge management processes and sustainable competitive advantage: An empirical examination in private universities. *Journal of Business Research*. https://doi.org/10.1016/J.JBUSRES.2018.02.013

Mahoney, J. T., & Pandian, J. R. (1992). The resource-based view within the conversation of strategic management. *Strategic Management Journal*, *13*(5), 363–380. https://doi.org/10.1002/smj.4250130505

Makadok, R., Burton, R., & Barney, J. (2018). A practical guide for making theory contributions in strategic management. *Strategic Management Journal*, *39*(6), 1530–1545. https://doi.org/10.1002/smj.2789

Malhotra, N. K., Nunan, D., & Birks, D. F. (2017). *Marketing Research: An Applied Approach* (5th ed.). United Kingdom: Pearson Education Limited.

Mao, H., Liu, S., Zhang, J., & Deng, Z. (2016). Information technology resource, knowledge management capability, and competitive advantage: The moderating role of resource commitment. *International Journal of Information Management*, *36*(6), 1062–1074. https://doi.org/10.1016/J.IJINFOMGT.2016.07.001

Martínez-Blanco, J., Lehmann, A., Muñoz, P., Antón, A., Traverso, M., Rieradevall, J., & Finkbeiner, M. (2014). Application challenges for the social Life Cycle Assessment of fertilizers within life cycle sustainability assessment. *Journal of Cleaner Production*, *69*, 34–48. https://doi.org/10.1016/j.jclepro.2014.01.044

Martinez-Conesa, I., Soto-Acosta, P., & Carayannis, E. G. (2017). On the path towards open innovation: assessing the role of knowledge management capability and environmental dynamism in SMEs. *Journal of Knowledge Management*, *21*(3), 553–570. https://doi.org/10.1108/JKM-09-2016-0403

Martynov, A., & Shafti, N. (2016). Long-term performance of firms: a review and research agenda. *Journal of Strategy and Management*, *9*(4), 429–448. https://doi.org/10.1108/JSMA-02-2015-0016

Maruta, R. (2014). The creation and management of organizational knowledge. *Knowledge-Based Systems*, *67*, 26–34. https://doi.org/10.1016/j.knosys.2014.06.012

Massingham, P. (2014). An evaluation of knowledge management tools: Part 1 – managing knowledge resources. *Journal of Knowledge Management*, *18*(6), 1075–1100. https://doi.org/10.1108/JKM-11-2013-0449

MASTIC. (2014). *National Survey of Innovation 2012*. Putrajaya.

Mathews, J. A. (2002). A resource-based view of Schumpeterian economic dynamics. *Journal of Evolutionary Economics*, *12*(1–2), 29–54. https://doi.org/10.1007/s00191-002-0106-z

MATRADE. (2017). Malaysia Products Directory. Retrieved from http://www.matrade.gov.my/en/malaysia-products-directory-matrade

McAdam, R., & McCreedy, S. (1999). A critical review of knowledge management models. *The Learning Organization*, *6*(3), 91–101. https://doi.org/10.1108/09696479910270416

McCarthy, N., Rouse, W. B., & Serban, N. (2015). Disentangling Competitive Advantage and Superior Performance and Their Roles in Enterprise Transformation. *Journal of Enterprise Transformation*, *5*(2), 113–140. https://doi.org/10.1080/19488289.2015.1040175

McGee, J. (2015). Market-Based View. In *Wiley Encyclopedia of Management* (pp. 1–1). Chichester, UK: John Wiley & Sons, Ltd. https://doi.org/10.1002/9781118785317.weom120075

McNabb, D. E. (2014). *Nonsampling Error in Social Surveys*. Thousand Oaks: SAGE Publications, Inc.

Meinhardt, R., Junge, S., & Weiss, M. (2018). The organizational environment with its measures, antecedents, and consequences: a review and research agenda. *Management Review Quarterly*, *68*(2), 195–235. https://doi.org/10.1007/s11301-018-0137-7

Mellahi, K., & Harris, L. C. (2016). Response Rates in Business and Management Research: An Overview of Current Practice and Suggestions for Future Direction. *British Journal of Management*, *27*(2), 426–437. https://doi.org/10.1111/1467-8551.12154

Mertens, W., Pugliese, A., & Recker, J. (2017). *Quantitative data analysis : a companion for accounting and information systems research*. Switzerland: Springer International Publishing .

MIDA. (2014). *Invest Byte: Your Investment Window into Malaysia*. Retrieved from http://www.mida.gov.my/env3/uploads/EnewsletterPDF/2014/42014.pdf

Miller, D., & Friesen, P. H. (1982). Innovation in conservative and entrepreneurial firms: Two models of strategic momentum. *Strategic Management Journal*, *3*(1), 1–25. https://doi.org/10.1002/smj.4250030102

Mills, A. M., & Smith, T. A. (2011). Knowledge management and organizational performance: a decomposed view. *Journal of Knowledge Management*, *15*(1), 156–171. https://doi.org/10.1108/13673271111108756

Ministry of Finance Malaysia. (2015). *Economic Report 2015/16*. Malaysia.

Mitchell, R., & Boyle, B. (2010). Knowledge creation measurement methods. *Journal of Knowledge Management*, *14*(1), 67–82. https://doi.org/10.1108/13673271011015570

MITI. (2019). *MITI Weekly Bulletin*. Retrieved from https://www.miti.gov.my/miti/resources/MITI Weekly

Bulletin/MITI_Weekly_Bulletin_Volume_521-31_January_2019.pdf

Mohamad, A. A., Ramayah, T., & Lo, M.-C. (2017). Knowledge Management In MSC Malaysia: The Role Of Information Technology Capability. *International Journal of Business & Society*, *18*, 651–660.

Mol, M. J., & Birkinshaw, J. (2009). The sources of management innovation: When firms introduce new management practices. *Journal of Business Research*, *62*(12), 1269–1280. https://doi.org/10.1016/j.jbusres.2009.01.001

Mol, M. J., & Birkinshaw, J. (2014). The Role of External Involvement in the Creation of Management Innovations. *Organization Studies*, *35*(9), 1287–1312. https://doi.org/10.1177/0170840614539313

Mooi, E., & Sarstedt, M. (2011). *A Concise Guide to Market Research*. Berlin, Heidelberg: Springer Berlin Heidelberg. https://doi.org/10.1007/978-3-642-12541-6

MPC. (2015). *Productivity Report 2014/2015*. Petaling Jaya.

Mundra, N., Gulati, K., & Vashisth, R. (2011). Achieving Competitive Advantage Through Knowledge Management and Innovation: Empirical Evidences from the Indian IT Sector. *IUP Journal of Knowledge Management*, *9*(2), 7–25.

Naldi, L., Wikström, P., & Von Rimscha, M. B. (2014). Dynamic Capabilities and Performance. *International Studies of Management and Organization*, *44*(4), 63–82. https://doi.org/10.2753/IMO0020-8825440404

Nam Nguyen, H., & Mohamed, S. (2011). Leadership behaviors, organizational culture and knowledge management practices. *Journal of Management Development*, *30*(2),

206–221. https://doi.org/10.1108/02621711111105786

Nambiar, S. (2010). The Global Crisis, Trade, and the Malaysia Economy. *International Journal of Management Studies*, *17*(Special Issue), 101–118.

Neuman, W. L. (2014). *Social Research Methods: Qualitative and Quantitative Approaches* (7th ed.). Harlow: Pearson Education Limited.

Newbert, S. L. (2007). Empirical research on the resource-based view of the firm: An assessment and suggestions for future research. *Strategic Management Journal*, *28*(2), 121–146. https://doi.org/10.1002/smj.573

Newbert, S. L. (2008). Value, rareness, competitive advantage, and performance: a conceptual-level empirical investigation of the resource-based view of the firm. *Strategic Management Journal*, *29*(7), 745–768. https://doi.org/10.1002/smj.686

Newbert, S. L. (2014). Assessing performance measurement in RBV research. *Journal of Strategy and Management*, *7*(3), 265–283. https://doi.org/10.1108/JSMA-10-2013-0061

Newell, S. (2014). Managing knowledge and managing knowledge work: what we know and what the future holds. *Journal of Information Technology*, *30*(1), 1–17. https://doi.org/10.1057/jit.2014.12

Ngah, R., Salleh, Z., Ab Wahab, I., & Azman, N. A. (2016). Intellectual Capital, Knowledge Management and Sustainable Competitive Advantage on SMEs in Malaysia. In *International Conference on Intellectual Capital and Knowledge Management and Organisational Learning* (pp. 348–356).

Nieves, J. (2016). Outcomes of Management Innovation: An Empirical Analysis in the Services Industry. *European Management Review*, *13*(2), 125–136. https://doi.org/10.1111/emre.12071

Nieves, J., & Segarra-Ciprés, M. (2015). Management innovation in the hotel industry. *Tourism Management*, *46*, 51–58. https://doi.org/10.1016/j.tourman.2014.06.002

Nonaka, I. (1994). A Dynamic Theory of Organizational Knowledge Creation. *Organization Science*, *5*(1), 14–37. https://doi.org/10.1287/orsc.5.1.14

Nonaka, I., Krogh, G. von, & von Krogh, G. (2009). Perspective—Tacit Knowledge and Knowledge Conversion: Controversy and Advancement in Organizational Knowledge Creation Theory. *Organization Science*, *20*(3), 635–652. https://doi.org/10.1287/orsc.1080.0412

Nonaka, I., & Takeuchi, H. (1995). *The Knowledge-creating Company: How Japanese Companies Create the Dynamics of Innovation*. Oxford University Press.

Nonaka, I., Toyama, R., & Konno, N. (2000). SECI, Ba and Leadership: a Unified Model of Dynamic Knowledge Creation. *Long Range Planning*, *33*(1), 5–34. https://doi.org/10.1016/S0024-6301(99)00115-6

Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.

O'Dell, C., & Grayson, C. J. (1998). If only we knew what we know: Identification and transfer of internal best practices. *California Management Review*, *40*(3), 154–175. https://doi.org/10.2307/41165948

O'Shannassy, T. (2008). Sustainable competitive advantage or temporary competitive

advantage: Improving understanding of an important strategy construct. *Journal of Strategy and Management*, *1*(2), 168–180. https://doi.org/10.1108/17554250810926357

OECD. (2005). *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*. *OECD and Eurostat Publication* (Vol. Third edit). https://doi.org/10.1787/9789264013100-en

OECD. (2016). *OECD Reviews of Innovation Policy: Malaysia 2016*. OECD Publishing. https://doi.org/10.1787/9789264255340-en

Oliver, S., & Reddy Kandadi, K. (2006). How to develop knowledge culture in organizations? A multiple case study of large distributed organizations. *Journal of Knowledge Management*, *10*(4), 6–24. https://doi.org/10.1108/13673270610679336

Oon, F. Y. (2014). *Effect of change management on operational excellence in the electrical and electronics industry*. Universiti Utara Malaysia.

Osman Rani, H., & Mohd. Haflah Piei. (1990). Malaysia's Industrialisation and Trade: Issues, Options and Strategies. *Jurnal Ekonomi Malaysia*.

Paillé, P., Chen, Y., Boiral, O., & Jin, J. (2014). The Impact of Human Resource Management on Environmental Performance: An Employee-Level Study. *Journal of Business Ethics*, *121*(3), 451–466. https://doi.org/10.1007/s10551-013-1732-0

Pais, L., Mónico, L., dos Santos, N. R., & Almeida, S. (2014). Deepening the Understanding of Knowledge Management Dimensions. In *European Conference on Knowledge Management* (pp. 792–801). Academic Conferences International

Limited.

Pallant, J. (2016). *SPSS Survival Manual: A step by step guide to data analysis using IBM SPSS* (6th ed.). Berkshire: McGraw-Hill Education.

Palmer, T. B., & Wiseman, R. M. (1999). Decoupling risk taking from income stream uncertainty: a holistic model of risk. *Strategic Management Journal*, *20*(11), 1037–1062. https://doi.org/10.1002/(SICI)1097-0266(199911)20:11<1037::AID-SMJ67>3.0.CO;2-2

Panda, S., & Rath, S. K. (2018). Information technology capability, knowledge management capability, and organizational agility: The role of environmental factors. *Journal of Management & Organization*, 1–27. https://doi.org/10.1017/jmo.2018.9

Pavlou, P. A., & El Sawy, O. A. (2011). Understanding the Elusive Black Box of Dynamic Capabilities. *Decision Sciences*, *42*(1), 239–273. https://doi.org/10.1111/j.1540-5915.2010.00287.x

PEMANDU. (2010). *Economic transformation programme: a roadmap for Malaysia.* Retrieved from http://etp.pemandu.gov.my/Download_Centre-@-Download_Centre.aspx

Penrose, E. T. (1959). *The theory of the growth of the firm*. New York: Wiley.

Pérez-López, S., & Alegre, J. (2012). Information technology competency, knowledge processes and firm performance. *Industrial Management & Data Systems*, *112*(4), 644–662. https://doi.org/10.1108/02635571211225521

Peteraf, M., Di Stefano, G., & Verona, G. (2013). The elephant in the room of dynamic

capabilities: Bringing two diverging conversations together. *Strategic Management Journal*, *34*(12), 1389–1410. https://doi.org/10.1002/smj.2078

Pino, C., Felzensztein, C., Zwerg-Villegas, A. M., & Arias-Bolzmann, L. (2016). Non-technological innovations: Market performance of exporting firms in South America. *Journal of Business Research*, *69*(10), 4385–4393. https://doi.org/10.1016/J.JBUSRES.2016.03.061

Porter, M. E. (1980). *Competitive Strategy: Techniques for Analyzing Industries and Competitors*. New York: Free Press.

Porter, M. E. (1985). *Competitive Advantage*. New York: Free Press.

Powell, T. C. (2001). Competitive advantage: logical and philosophical considerations. *Strategic Management Journal*, *22*(9), 875–888. https://doi.org/10.1002/smj.173

Pratono, A. H., & Mahmood, R. (2014). Social Capital and Firm Performance: Moderating Effect of Environmental Turbulence. *Asian Social Science*, *10*(19), 59–68. https://doi.org/10.5539/ass.v10n19p59

Priem, R. L., & Butler, J. E. (2001). Is the Resource-Based "View" a Useful Perspective for Strategic Management Research? *Academy of Management Review*, *26*(1), 22–40. https://doi.org/10.5465/AMR.2001.4011928

Quintas, P., Lefrere, P., & Jones, G. (1997). Knowledge management: A strategic agenda. *Long Range Planning*, *30*(3), 385–391. https://doi.org/10.1016/S0024-6301(97)90252-1

Ragab, M., & Arisha, A. (2013). Knowledge management and measurement: a critical

review. *Journal of Knowledge Management*, *17*(6), 873–901. https://doi.org/10.1108/JKM-12-2012-0381

Rahimli, A. (2012). Knowledge Management and Competitive Advantage. *Information and Knowledge Management*, *2*(7), 37–43. Retrieved from http://iiste.org/Journals/index.php/IKM/article/view/3255

Rahman, M. K., Aflah, N., Chowdhury, N. A., & Khan, A. H. (2014). Shift Share Analysis of Malaysia's Export on Natural Rubber. *International Journal of Business and Applied Science*, *1*(1), 1–12.

Rajak, S., & Vinodh, S. (2015). Application of fuzzy logic for social sustainability performance evaluation: a case study of an Indian automotive component manufacturing organization. *Journal of Cleaner Production*, *108*, 1184–1192. https://doi.org/10.1016/j.jclepro.2015.05.070

Ramayah, T., Cheah, J., Chuah, F., Ting, H., & Mumtaz, A. M. (2016). *Partial Least Square Structural Equation Modeling (PLS-SEM) using SmartPLS 3.0*. Kuala Lumpur: Pearson.

Rashid, Z. A., & Elameer, A. E. (1999). Sources of industrial growth using the factor decomposition approach: Malaysia, 1978–87. *The Developing Economies*, *37*(2), 162–196.

Rasiah, R. (1995). Labour and industrialization in Malaysia. *Journal of Contemporary Asia*, *25*(1), 73–92. https://doi.org/10.1080/00472339580000041

Rasiah, R. (1996). Manufacturing as Engine of Growth and Industrialisation in Malaysia.

Managerial Finance, *22*(5), 87–117. https://doi.org/10.1108/eb018566

Rasiah, R. (2011). Is Malaysia Facing Negative Deindustrialization? *Pacific Affairs*, *84*(4), 714–735.

Rasiah, R. (2017). The Industrial Policy Experience of the Electronics Industry in Malaysia. In J. Page & F. Tarp (Eds.), *The Practice of Industrial Policy: Government— Business Coordination in Africa and East Asia* (pp. 123–144). Oxford: Oxford University Press.

Rasiah, R., Mubarik, S., & Yap, X.-S. (2017). Financing Technological Upgrading in East Asia. *Lahore Journal of Economics*, *22*(Special Edition), 153–182.

Rasiah, R., Xiao-Shan, Y., & Chandran Govindaraju, V. G. R. (2014). Crisis Effects on the Electronics Industry in Southeast Asia. *Journal of Contemporary Asia*, *44*(4), 645–663. https://doi.org/10.1080/00472336.2014.923637

Rasiah, R., & Yap, X.-S. (2015). Innovation Performance of the Malaysian Economy. In S. Dutta, B. Lanvin, & S. Wunsch-Vincent (Eds.), *The Global Innovation Index 2015: Effective Innovation Policies for Development* (pp. 139–146). Fontainebleau; Ithaca; Geneva: INSEAD; Cornell University; WIPO.

Ray, G., Barney, J. B., & Muhanna, W. A. (2004). Capabilities, business processes, and competitive advantage: choosing the dependent variable in empirical tests of the resource-based view. *Strategic Management Journal*, *25*(1), 23–37. https://doi.org/10.1002/smj.366

Reed, R., & DeFillippi, R. J. (1990). Causal Ambiguity, Barriers to Imitation, and

Sustainable Competitive Advantage. *Academy of Management Review*, *15*(1), 88–102. https://doi.org/10.5465/AMR.1990.4308277

Revilla, M. A., Saris, W. E., & Krosnick, J. A. (2014). Choosing the Number of Categories in Agree–Disagree Scales. *Sociological Methods & Research*, *43*(1), 73–97. https://doi.org/10.1177/0049124113509605

Ringle, C. M., Sarstedt, M., & Straub, D. W. (2012). Editor's comments: a critical look at the use of PLS-SEM in MIS quarterly. *MIS Quarterly*, *36*(1), iii–xiv.

Ringle, C. M., Wende, S., & Becker, J. M. (2015). Smart PLS 3. Bönningstedt. Retrieved from http://www.smartpls.com

Roberson, Q., Holmes, O., & Perry, J. L. (2017). Transforming Research on Diversity and Firm Performance: A Dynamic Capabilities Perspective. *Academy of Management Annals*, *11*(1), 189–216. https://doi.org/10.5465/annals.2014.0019

Rogelberg, S. G., & Stanton, J. M. (2007). Introduction. *Organizational Research Methods*, *10*(2), 195–209. https://doi.org/10.1177/1094428106294693

Rohana, K., & Tajul Ariffin, M. (2010). Sources of Growth in the Manufacturing Sector in Malaysia: Evidence from ARDL and Structural Decomposition Analysis. *Asian Academy of Management Journal*, *15*(1), 99–116. Retrieved from http://web.usm.my/aamj/15.1.2010/AAMJ_15.1.6.pdf

Rosen, M. A., & Kishawy, H. A. (2012). Sustainable Manufacturing and Design: Concepts, Practices and Needs. *Sustainability*, *4*(12), 154–174. https://doi.org/10.3390/su4020154

Rouse, M. J., & Daellenbach, U. S. (1999). Rethinking research methods for the resource-based perspective: isolating sources of sustainable competitive advantage. *Strategic Management Journal*, *20*(5), 487–494. https://doi.org/10.1002/(SICI)1097-0266(199905)20:5<487::AID-SMJ26>3.0.CO;2-K

Ruel, E., Wagner, W. E., & Gillespie, B. J. (2016). *The practice of survey research: Theory and applications*. London: Sage.

Rumelt, R. P. (1991). How much does industry matter? *Strategic Management Journal*, *12*(3), 167–185. https://doi.org/10.1002/smj.4250120302

Rusly, F. H., Sun, P. Y.-T., & Corner, J. L. (2015). Change readiness: creating understanding and capability for the knowledge acquisition process. *Journal of Knowledge Management*, *19*(6), 1204–1223. https://doi.org/10.1108/JKM-02-2015-0092

Ryu, H.-S., & Lee, J. (2015). How Non-technological Innovation Reinforces the Effect of Technological Innovation on Firm Performance?: An Empirical Study of Korean Manufacturing Industry (pp. 176–182). Springer International Publishing. https://doi.org/10.1007/978-3-319-21383-5_30

Salkind, N. J. (2018). *Exploring Research* (9th ed.). Boston: Pearson.

Sapprasert, K., & Clausen, T. H. (2012). Organizational innovation and its effects. *Industrial and Corporate Change*, (5), 1283–1305. https://doi.org/10.1093/icc/dts023

Sarstedt, M., Hair, J. F., Ringle, C. M., Thiele, K. O., & Gudergan, S. P. (2016).

Estimation issues with PLS and CBSEM: Where the bias lies! *Journal of Business Research*, *69*(10), 3998–4010. https://doi.org/10.1016/J.JBUSRES.2016.06.007

Sarstedt, M., Ringle, C. M., & Hair, J. F. (2017). Partial Least Squares Structural Equation Modeling. In *Handbook of Market Research* (pp. 1–40). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-05542-8_15-1

Saunders, M., Lewis, P., & Thornhill, A. (2012). *Research Methods for Business Students* (6th ed.). Edinburgh Gate: Pearson Education Limited.

Sax, L. J., Gilmartin, S. K., & Bryant, A. N. (2003). Assessing Response Rates and Nonresponse Bias in Web and Paper Surveys. *Research in Higher Education*, *44*(4), 409–432. https://doi.org/10.1023/A:1024232915870

Scarbrough, H., & Swan, J. (2001). Explaining the Diffusion of Knowledge Management: The Role of Fashion. *British Journal of Management*, *12*(1), 3–12. https://doi.org/10.1111/1467-8551.00182

Schellekens, P. (2010). *Malaysia economic monitor : growth through innovation (English)*. Washington, DC.

Schilke, O. (2014). On the contingent value of dynamic capabilities for competitive advantage: The nonlinear moderating effect of environmental dynamism. *Strategic Management Journal*, *35*(2), 179–203. https://doi.org/10.1002/smj.2099

Schilke, O. (2014). Second-Order Dynamic Capabilities: How Do They Matter? *Academy of Management Perspectives*, *28*(4), 368–380. https://doi.org/10.5465/amp.2013.0093

Schilke, O., Hu, S., & Helfat, C. E. (2018). Quo Vadis, Dynamic Capabilities? A Content-Analytic Review of the Current State of Knowledge and Recommendations for Future Research. *Academy of Management Annals*, *12*(1), 390–439. https://doi.org/10.5465/annals.2016.0014

Sekaran, U., & Bougie, R. (2013). Research Methods for Business (6th ed., p. 436). Chichester: John Wiley & Sons.

Serenko, A., & Bontis, N. (2013). The intellectual core and impact of the knowledge management academic discipline. *Journal of Knowledge Management*, *17*(1), 137–155. https://doi.org/10.1108/13673271311300840

Serenko, A., & Dumay, J. (2015). Citation classics published in *Knowledge Management* journals. Part II: studying research trends and discovering the Google Scholar Effect. *Journal of Knowledge Management*, *19*(6), 1335–1355. https://doi.org/10.1108/JKM-02-2015-0086

Shafia, M. A., Shavvalpour, S., Hosseini, M., & Hosseini, R. (2016). Mediating effect of technological innovation capabilities between dynamic capabilities and competitiveness of research and technology organisations. *Technology Analysis & Strategic Management*, *28*(7), 1–16. https://doi.org/10.1080/09537325.2016.1158404

Sher, P. J., & Lee, V. C. (2004). Information technology as a facilitator for enhancing dynamic capabilities through knowledge management. *Information & Management*, *41*(8), 933–945. https://doi.org/10.1016/j.im.2003.06.004

Sigalas, C. (2015). Competitive advantage: the known unknown concept. *Management Decision*, *53*(9), 2004–2016. https://doi.org/10.1108/MD-05-2015-0185

Sigalas, C., & Economou, V. P. (2013). Revisiting the concept of competitive advantage: Problems and fallacies arising from its conceptualization. *Journal of Strategy and Management*, *6*(1), 61–80. https://doi.org/http://dx.doi.org/10.1108/17554251311296567

Sigalas, C., & Papadakis, V. M. (2018). Empirical investigation of relationship patterns between competitive advantage and superior performance. *Journal of Strategy and Management*, *11*(1), 81–111. https://doi.org/10.1108/JSMA-01-2017-0010

Simerly, R. L., & Li, M. (2000). Environmental dynamism, capital structure and performance: a theoretical integration and an empirical test. *Strategic Management Journal*, *21*(1), 31–49. https://doi.org/10.1002/(SICI)1097-0266(200001)21:1<31::AID-SMJ76>3.0.CO;2-T

Simon, H. A. (1955). A Behavioral Model of Rational Choice. *The Quarterly Journal of Economics*, *69*(1), 99–108. https://doi.org/10.2307/1884852

Singh, B., & Rao, M. K. (2016). Effect of intellectual capital on dynamic capabilities. *Journal of Organizational Change Management*, *29*(2), 129–149. https://doi.org/10.1108/JOCM-12-2014-0225

Sirmon, D. G., Hitt, M. A., & Ireland, R. D. (2007). Managing Firm Resources in Dynamic Environments to Create Value: Looking Inside the Black Box. *Academy of Management Review*, *32*(1), 273–292. https://doi.org/10.5465/amr.2007.23466005

Steiber, A., & Alänge, S. (2015). Organizational innovation: a comprehensive model for catalyzing organizational development and change in a rapidly changing world. *Triple Helix*, *2*(1), 1–25. https://doi.org/10.1186/s40604-015-0021-6

Stewart, T. A. (1997). *Intellectual Capital: The New Wealth of Organizations*. New York: Doubleday.

Storey, J., & Barnett, E. (2000). Knowledge management initiatives: learning from failure. *Journal of Knowledge Management*, *4*(2), 145–156. https://doi.org/10.1108/13673270010372279

Sullivan, G. M., & Feinn, R. (2012). Using Effect Size-or Why the P Value Is Not Enough. *Journal of Graduate Medical Education*, *4*(3), 279–282. https://doi.org/10.4300/JGME-D-12-00156.1

Summers, J. O. (2001). Guidelines for Conducting Research and Publishing in Marketing: From Conceptualization through the Review Process. *Journal of the Academy of Marketing Science*, *29*(4), 405–415. https://doi.org/10.1177/03079450094243

Svensson, G., & Wagner, B. (2012). Business sustainability and E-footprints on Earth's life and ecosystems: generic models. *European Business Review*, *24*(6), 543–552. https://doi.org/10.1108/09555341211270555

Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics* (6th ed.). Boston: Person Education.

Tan, L. P., & Wong, K. Y. (2015). Linkage between knowledge management and manufacturing performance: a structural equation modeling approach. *Journal of*

Knowledge Management, *19*(4), 814–835. https://doi.org/10.1108/JKM-11-2014-0487

Tang, C. F., Yip, C. Y., & Ozturk, I. (2014). The determinants of foreign direct investment in Malaysia: A case for electrical and electronic industry. *Economic Modelling*, *43*, 287–292. https://doi.org/10.1016/J.ECONMOD.2014.08.017

Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, *28*(13), 1319–1350. https://doi.org/10.1002/smj.640

Teece, D. J. (2014). The Foundations of Enterprise Performance: Dynamic and Ordinary Capabilities in an (Economic) Theory of Firms. *Academy of Management Perspectives*, *28*(4), 328–352. https://doi.org/10.5465/amp.2013.0116

Teece, D. J., Pisano, G., Shuen, A., & Winter, S. G. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*, *18*(10), 509–533. https://doi.org/10.1002/(SICI)1097-0266(199708)18:7<509::AID-SMJ882>3.0.CO;2-Z

Tether, B. S., & Tajar, A. (2008). The organisational-cooperation mode of innovation and its prominence amongst European service firms. *Research Policy*, *37*(4), 720–739. https://doi.org/10.1016/j.respol.2008.01.005

Tseng, S.-M. (2014). The impact of knowledge management capabilities and supplier relationship management on corporate performance. *International Journal of Production Economics*, *154*, 39–47.

Tushman, M. L., & O'Reilly, C. A. (2002). *Winning through innovation : a practical guide to leading organizational change and renewal*. Boston: Harvard Business School Press.

Vaccaro, I. G., Jansen, J. J. P., Van Den Bosch, F. A. J., & Volberda, H. W. (2012). Management Innovation and Leadership: The Moderating Role of Organizational Size. *Journal of Management Studies*, *49*(1), 28–51. https://doi.org/10.1111/j.1467-6486.2010.00976.x

Vachon, S., & Klassen, R. D. (2008). Environmental management and manufacturing performance: The role of collaboration in the supply chain. *International Journal of Production Economics*, *111*(2), 299–315. https://doi.org/10.1016/j.ijpe.2006.11.030

van Reijsen, J., Helms, R., Batenburg, R., & Foorthuis, R. (2015). The impact of knowledge management and social capital on dynamic capability in organizations. *Knowledge Management Research & Practice*, *13*(4), 401–417. https://doi.org/10.1057/kmrp.2013.59

van Sonderen, E., Sanderman, R., & Coyne, J. C. (2013). Ineffectiveness of reverse wording of questionnaire items: let's learn from cows in the rain. *PloS One*, *8*(7), e68967. https://doi.org/10.1371/journal.pone.0068967

Vinayan, G., Jayashree, S., & Marthandan, G. (2012). Critical success factors of sustainable competitive advantage: A study in Malaysian manufacturing industries. *International Journal of Business and Management*, *7*(22), 29–45. https://doi.org/10.5539/ijbm.v7n22p29

Volberda, H. W., Van Den Bosch, F. A. J., & Heij, C. V. (2013). Management Innovation: Management as Fertile Ground for Innovation. *European Management Review*, *10*(1), 1–15. https://doi.org/10.1111/emre.12007

Volberda, H. W., Van Den Bosch, F. A. J., & Mihalache, O. R. (2014). Advancing Management Innovation: Synthesizing Processes, Levels of Analysis, and Change Agents. *Organization Studies*, *35*(9), 1245–1264. https://doi.org/10.1177/0170840614546155

von den Driesch, T., Eva Susanne da Costa, M., Christina Flatten, T., & Brettel, M. (2015). How CEO experience, personality, and network affect firms' dynamic capabilities. *European Management Journal*, *33*(4), 245–256. https://doi.org/10.1016/J.EMJ.2015.01.003

von Krogh, G. (1998). Care in Knowledge Creation. *California Management Review*, *40*(3), 133–153. https://doi.org/10.2307/41165947

Wagner, M. (2007). Integration of Environmental Management with Other Managerial Functions of the Firm: Empirical Effects on Drivers of Economic Performance. *Long Range Planning*, *40*(6), 611–628. https://doi.org/10.1016/j.lrp.2007.08.001

Walker, R. M., Chen, J., & Aravind, D. (2015). Management innovation and firm performance: An integration of research findings. *European Management Journal*, *33*(5), 407–422. https://doi.org/10.1016/j.emj.2015.07.001

Walsh, J. P., & Ungson, G. R. (1991). Organizational Memory. *Academy of Management Review*, *16*(1), 57–91. https://doi.org/10.5465/AMR.1991.4278992

Wang, C. L., & Ahmed, P. K. (2007). Dynamic capabilities: A review and research agenda. *International Journal of Management Reviews*, *9*(1), 31–51. https://doi.org/10.1111/j.1468-2370.2007.00201.x

Wang, H.-L. (2014). Theories for competitive advantage. In H. Hasan (Ed.), *Being Practical with Theory: A Window into Business Research* (pp. 33–43).

Wee, C. N. J., & Chua, Y. K. A. (2013). The peculiarities of knowledge management processes in SMEs: the case of Singapore. *Journal of Knowledge Management*, *17*(6), 958–972. https://doi.org/10.1108/JKM-04-2013-0163

Werner, S., Praxedes, M., & Kim, H.-G. (2007). The Reporting of Nonresponse Analyses in Survey Research. *Organizational Research Methods*, *10*(2), 287–295. https://doi.org/10.1177/1094428106292892

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, *5*(2), 171–180. https://doi.org/10.1002/smj.4250050207

Wetzels, M., Odekerken-Schröder, G., & van Oppen, C. (2009). Using PLS Path Modeling for Assesing Hierarchical Construct Models : Guidelines and Empirical Illustration. *MIS Quarterly*, *33*(1), 177–195.

White, P. (2009). Building a sustainability strategy into the business. *Corporate Governance: The International Journal of Business in Society*, *9*(4), 386–394. https://doi.org/10.1108/14720700910984936

Wiggins, R. R., & Ruefli, T. W. (2002). Sustained Competitive Advantage: Temporal Dynamics and the Incidence and Persistence of Superior Economic Performance.

Organization Science, *13*(1), 82–105. https://doi.org/https://doi.org/10.1287/orsc.13.1.81.542

Wilden, R., Devinney, T. M., & Dowling, G. R. (2016). The Architecture of Dynamic Capability Research Identifying the Building Blocks of a Configurational Approach. *The Academy of Management Annals*, *10*(1), 997–1076. https://doi.org/10.1080/19416520.2016.1161966

Wilden, R., & Gudergan, S. P. (2015). The impact of dynamic capabilities on operational marketing and technological capabilities: investigating the role of environmental turbulence. *Journal of the Academy of Marketing Science*, *43*(2), 181–199. https://doi.org/10.1007/s11747-014-0380-y

Wilden, R., Gudergan, S. P., Nielsen, B. B., & Lings, I. (2013). Dynamic Capabilities and Performance: Strategy, Structure and Environment. *Long Range Planning*, *46*(1), 72–96. https://doi.org/10.1016/j.lrp.2012.12.001

Wilhelm, H., Schlömer, M., & Maurer, I. (2015). How Dynamic Capabilities Affect the Effectiveness and Efficiency of Operating Routines under High and Low Levels of Environmental Dynamism. *British Journal of Management*, *26*(2), 327–345. https://doi.org/10.1111/1467-8551.12085

Winter, S. G. (2003). Understanding dynamic capabilities. *Strategic Management Journal*, *24*(10), 991–995. https://doi.org/10.1002/smj.318

Wold, H. (1974). Causal flows with latent variables: Partings of the ways in the light of NIPALS modelling. *European Economic Review*, *5*(1), 67–86.

https://doi.org/10.1016/0014-2921(74)90008-7

Wong, N., Rindfleisch, A., & Burroughs, J. E. (2003). Do Reverse-Worded Items Confound Measures in Cross-Cultural Consumer Research? The Case of the Material Values Scale. *Journal of Consumer Research*, *30*(1), 72–91. https://doi.org/10.1086/374697

Wong, S.-H. (2018, October 25). Focused strategies to drive growth of E&E sector. *The Star*. Retrieved from https://www.thestar.com.my/business/business-news/2018/10/25/focused-strategies-to-drive-growth-of-ee-sector/#dVX5DAcP8DO3tptp.99

World Bank. (2014). *Malaysia economic monitor : boosting trade competitiveness.* Washington, DC. Retrieved from http://documents.worldbank.org/curated/en/2014/06/19734290/malaysia-economic-monitor-boosting-trade-competitiveness

World Bank. (2018). *World Bank East Asia and Pacific Economic Update, October 2018 : Navigating Uncertainty*. Washington, DC.

World Bank Group. (2017). *Malaysia Economic Monitor December 2017: Turmoil to Transformation, 20 Years after the Asian Financial Crisis*. Washington, DC.

Yaghoubi, H., Mahallati, T., Moghadam, A. S., & Rahimi, E. (2014). Transformational Leadership: Enabling Factor of Knowledge Management Practices. *Journal of Management and Sustainability*, *4*(3), 165–174. https://doi.org/10.5539/jms.v4n3p165

Yang, T., Xun, J., & He, X. (2015). British SMEs' e-commerce technological investments and firm performance: an RBV perspective. *Technology Analysis & Strategic Management*, *27*(5), 586–603. https://doi.org/https://doi.org/10.1080/09537325.2015.1019453

Yusof, Z. A., & Deepak, B. (2008). *Economic Growth and Development in Malaysia: Policy Making and Leadership*. Washington, DC.

Yusoff, M. B., Abu Hassan, F., & Abdul Jalil, S. (2000). Globalisation, economic policy and equity: the case of Malaysia. In *Poverty and Income Inequality in Developing Countries: A Policy Dialogue on the Effects of Globalisation*. Paris: OECD.

Yusuf, S., & Nabeshima, K. (2009). *Tiger Economies Under Threat: A Comparative Analysis of Malaysia's Industrial Prospects and Policy Options*. Washington: DC: World Bank.

Zahra, S. A., Sapienza, H. J., & Davidsson, P. (2006). Entrepreneurship and Dynamic Capabilities: A Review, Model and Research Agenda. *Journal of Management Studies*, *43*(4), 917–955. https://doi.org/10.1111/j.1467-6486.2006.00616.x

Zhang, M., Di Fan, D., & Zhu, C. J. (2014). High-Performance Work Systems, Corporate Social Performance and Employee Outcomes: Exploring the Missing Links. *Journal of Business Ethics*, *120*(3), 423–435. https://doi.org/10.1007/s10551-013-1672-8

Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2010). *Business research methods (8th ed.)*. Mason, HO: Cengage Learning.

Zollo, M., & Winter, S. G. (2002). Deliberate Learning and the Evolution of Dynamic

Capabilities. *Organization Science*, *13*(3), 339–351. https://doi.org/10.1287/orsc.13.3.339.2780

APPENDIX A

Othman Yeop Abdullah (OYA) Graduate School of Business

Universiti Utara Malaysia

Study of Sustainable Competitive Advantage in Electrical & Electronics Manufacturing Industry in Malaysia

This questionnaire should take 15-20 minutes to complete. Your participation is very important to this study and it will be kept strictly anonymous and confidential. Please complete the questionnaire at your earliest convenience.

Part A: Background Information

We would like to obtain some information about your firm to help us better understand your perception on sustainable competitive advantage.
*Please **tick (√)** the appropriate answer*

1. Which of the following best describes the sector in which your firm operates?
   You may choose more than one.
   - □ Consumer Electronics
   - □ Electronic Components
   - □ Industrial Electronics
   - □ Electrical

2. Please indicate the *State* where your production is located
   - □ Perlis
   - □ Kedah
   - □ Penang
   - □ Perak
   - □ Selangor
   - □ Kuala Lumpur
   - □ Negeri Sembilan
   - □ Melacca
   - □ Johor
   - □ Kelantan
   - □ Terengganu
   - □ Pahang
   - □ Sabah
   - □ Sarawak

3. Please indicate how long your firm has been in the business
   - □ Less than 5 years
   - □ 5-10 years
   - □ 11-15 years
   - □ More than 15 years

4. Please indicate the business legal structure
   - □ Individual proprietorship
   - □ Partnership
   - □ Private limited company
   - □ Public limited company

5. Please specify the type of ownership of your firm
   - □ Held directly by Malaysian resident
   - □ Held directly by non-Malaysian resident
   - □ Joint ownership

6. Please indicate the type of market orientation
   - Domestic oriented
   - Export oriented
   - Both domestic and export

7. What is your firm's annual sale turnover?
   - Less than RM 300, 000
   - RM 300,000 to RM 15 million
   - RM 15 million to RM 50 million
   - More than RM 50 million

8. Please indicate the number of full-time employees in your firm
   - Less than 75 employees
   - 75 to 200 employees
   - More than 200 employees

Part B: Perception of Sustainable Competitive Advantage (SCA)

Sustainable competitive advantage (hereafter SCA) is imperative for a business firm to survive and succeed in the complex and turbulent business landscape. Now, we would like to learn about your perception on your firm's prospect to sustain in the electrical & electronics (hereafter E&E) industry in the near future.

*Please indicate the extent to which you AGREE or DISAGREE with each of the statement below by **ticking (√)** the most appropriate answer for each statement.*

	Compared to our key competitors, ...	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1	Our firm is more successful.					
2	Our firm has a greater market share.					
3	Our firm is growing fast.					
4	Our firm is more profitable.					
5	Our firm is more innovative.					
6	Our firm aims to reduce wastes and emissions from our operations.					
7	Our firm aims to reduce the environmental impacts of our products/service.					
8	Our firm aims to reduce the utilisation of non-renewable materials, chemicals and components.					
9	Our firm aims to reduce the risk of workplace accidents.					
10	Our firm treats our employees fairly.					
11	Our firm does not tolerate unethical business behaviour.					
12	Our firm strictly abides by the labour law.					
13	Our firm does not force our employees to work overtime.					
14	Our firm takes a serious view on workplace safety.					

Part C: Determinants of firm's ability to achieve SCA

The following statements are factors that influence your firm to achieve sustainable competitive advantage.

*Please indicate the extent to which you AGREE or DISAGREE with each of these statements. Please **tick (√)** the most appropriate answer for each statement.*

1. Management Innovation

	It is my perception that,	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1	Our firm frequently introduces organisational changes to improve the division of responsibilities (e.g., decentralisation, department restructuring, etc.).					
2	Our firm frequently introduces organisational changes to improve the decision making (e.g., decentralisation, department restructuring, etc.).					
3	Our firm frequently introduces new methods for managing external relationships with other firms or public institutions (e.g., new alliances, new forms of cooperation, etc.).					
4	Our firm often introduces new practices in organisation or firm procedures (e.g., new quality management practices, new information and knowledge-management systems, etc.).					

2. Environmental Dynamism

	It is my perception that,	**Strongly Disagree**	**Disagree**	**Neutral**	**Agree**	**Strongly Agree**
1	Rapid development of new products and services is common in our industry.					
2	The pace of technological progress in our industry is fast.					
3	The actions of our competitors are difficult to predict.					
4	Changes in customer needs are difficult to predict.					

3. Knowledge Management

	It is my perception that,	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Our employees acquire knowledge from customers or suppliers.					
2	Our employees acquire knowledge from the firm's knowledge repositories.					
3	Our employees acquire knowledge from the internet or world wide web.					
4	Our employees acquire knowledge from trainings, workshops or seminars.					
5	Our employees gain new knowledge, ideas or solutions related to their tasks.					
6	Our employees participate in brainstorming sessions to create new knowledge.					
7	Our employees work in teams to create new knowledge.					
8	Our employees apply the best practices to complete their tasks.					
9	Our employees apply knowledge from previous cases to solve problems.					
10	Our employees apply existing knowledge to generate value.					
11	Our employees apply knowledge learnt from mistakes or experiences.					
12	Our employees organise/ classify knowledge for ease of retrieval.					
13	Our employees spend time to codify and store knowledge in the firm's knowledge repositories.					
14	Our employees constantly update the knowledge repositories.					
15	Our employees are willing to contribute knowledge to the firm's knowledge repositories.					
16	Our employees participate in meetings, discussions or other knowledge sharing activities.					
17	Our employees use technological tools (groupware, e-mails, networking tools, etc.) to share knowledge.					
18	Our employees share knowledge through collaboration and interaction with each other.					
19	Our firm provide mentorship program to the employees.					

4. Dynamic Capabilities

	It is my perception that,	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1	Our firm is aware of new business opportunities.					
2	Our firm is aware of possible threats.					
3	Our firm understands customers' needs.					
4	Our firm is good at collecting market information.					
5	Our firm is good at gathering economic information on our daily operations.					
6	Our firm is good at exploring potential market.					
7	Our firm is good at evaluating our strengths and weaknesses.					
8	Our firm learns or acquires new skills from partners. (e.g., competitors, suppliers, strategic alliances, etc.).					
9	Our firm adopts the best practices in the industry.					
10	Our firm changes our practices when needed.					
11	Our firm has the ability to change our ways of doing business.					
12	Our firm has the ability to reconfigure resources.					
13	Our firm has the ability to rapidly respond to competitors' action.					
14	Our firm has the ability to communicate effectively with our shareholders.					
15	Our firm has the ability to develop new product/service.					
16	Our firm has the ability to compete in the industry.					

Part D: Respondent's Profile

Lastly, we would like to have a better understanding of your personal background. Please ***tick (√)*** an appropriate box

1. What is your current position in your firm?
   - □ Managing Director
   - □ Chief Executive Officer
   - □ Manager
   - □ Others. Please specify ……

2. Please indicate your gender
   - □ Male
   - □ Female

3. Please indicate how long you have been working with this company
   - □ Less than 5 years
   - □ 5 years to 10 years
   - □ 11 years to 15 years
   - □ More than 15 years

4. Please indicate your highest level of education
   - □ SPM or equivalent
   - □ Certificate
   - □ STPM or equivalent
   - □ Diploma
   - □ Advanced Diploma
   - □ Bachelor
   - □ Postgraduate

5. Would you like to have a soft-copy of the summary of the findings? If yes, please provide your email address. _____

Please use this space if you wish to share your insights about your perception on Sustainable Competitive Advantage.

Thank you.

APPENDIX B

Mahalanobis distance

No	D^2
1	1.27729
2	2.71538
3	3.64189
4	4.03976
5	2.89023
6	1.42054
7	5.27763
8	3.23529
9	9.00304
10	7.51809
11	4.44268
12	4.8857
13	2.74143
14	4.44915
15	6.99558
16	22.68452
17	17.08084
18	0.43945
19	2.64128
20	7.34148
21	4.03946
22	9.72015
23	7.92051
24	2.65429
25	13.74496
26	4.02611
27	4.7556
28	9.02381
29	3.55978
30	7.30741
31	2.73674
32	5.19534
33	7.11637
34	15.22802
35	6.40112

36	5.42306
37	9.86728
38	9.97254
39	5.63155
40	1.77908
41	7.65622
42	15.16746
43	18.64927
44	11.01779
45	3.95062
46	5.95186
47	1.87004
48	1.55358
49	2.07752
50	16.68749
51	11.65584
52	7.01801
53	4.4183
54	6.04587
55	2.18954
56	4.87095
57	19.75111
58	3.30079
59	24.06636
60	5.92371
61	2.48223
62	2.73215
63	0.70704
64	2.88034
65	14.68968
66	8.70401
67	1.53282
68	3.99399
69	2.89896
70	3.0435
71	2.32911
72	4.70716
73	6.91495
74	1.80424
75	6.05812
76	1.62969

77	5.99445
78	3.0891
79	1.14179
80	1.78281
81	3.49145
82	11.78204
83	1.46677
84	4.82492
85	1.20959
86	9.70947
87	9.98243
88	5.8321
89	2.81219
90	3.95927
91	3.14721
92	2.48512
93	3.39419
94	1.72987
95	5.36175
96	15.47059
97	5.89769
98	0.76882
99	1.16288
100	3.14159
101	0.83169
102	5.84508
103	3.19691
104	2.01589
105	8.74643
106	11.91345
107	8.1659
108	2.46455
109	10.1907
110	3.91708
111	2.16038
112	0.94182
113	4.10684
114	13.60322
115	3.58222
116	5.74968
117	1.27268

118	2.1997
119	0.49519
120	3.96897
121	3.10058
122	2.24368
123	0.89003
124	17.90505
125	15.45436
126	1.44951
127	1.23083
128	1.95346
129	0.31698
130	1.49918
131	2.1672
132	3.1947
133	1.16132
134	7.5832
135	1.9516
136	2.40061
137	2.49681
138	1.28359
139	2.12324
140	4.9042
141	2.99434
142	3.46492
143	4.59847
144	1.36373
145	1.65119
146	1.62386
147	6.07915
148	1.58334
149	1.24126
150	6.52814
151	5.35743
152	1.7758
153	6.83218
154	1.51416
155	4.97913
156	0.30416
157	1.17154
158	2.92241

159	0.90054
160	2.14352
161	0.54238
162	1.32456
163	10.85292
164	0.82907
165	0.96035
166	3.6879
167	4.77261
168	3.17895
169	8.50499
170	4.76565
171	0.80949
172	1.20811
173	0.50437
174	1.00478
175	5.11856
176	1.84578
177	1.86296
178	5.53208
179	1.63699
180	2.70375
181	13.48509
182	1.94785
183	2.57771
184	8.27577
185	0.96671